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MINERALS YEARBOOK

Area Reports: International 2013

Latin America and Canada

Volume III

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U.S. Department of the Interior
U.S. Geological Survey

MINERALS YEARBOOK

Area Reports: International 2013

Latin America and Canada

Volume III

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U.S. DEPARTMENT OF THE INTERIOR
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U.S. GEOLOGICAL SURVEY
Suzette M. Kimball, Director

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Foreword

This edition of the U.S. Geological Survey (USGS) Minerals Yearbook discusses the performance of the worldwide minerals and materials industries during 2013 and provides background information to assist in interpreting that performance. Content of the individual Minerals Yearbook volumes follows:

- Volume I, Metals and Minerals, contains chapters about virtually all metallic and industrial mineral commodities important to the U.S. economy. Chapters on survey methods, summary statistics for domestic nonfuel minerals, and trends in mining and quarrying in the metals and industrial mineral industries in the United States are also included.
- Volume II, Area Reports: Domestic, contains a chapter on the mineral industry of each of the 50 States and Puerto Rico and the Administered Islands. This volume also has chapters on survey methods and summary statistics of domestic nonfuel minerals.
- Volume III, Area Reports: International, is published as four separate reports. These regional reports contain the latest available minerals data on more than 190 foreign countries and discuss the importance of minerals to the economies of these nations and the United States. Each report begins with an overview of the region's mineral industries during the year. It continues with individual country chapters that examine the mining, refining, processing, and use of minerals in each country of the region and how each country's mineral industry relates to U.S. industry. Most chapters include production tables and industry structure tables, information about Government policies and programs that affect the country's mineral industry, and an outlook section.

The USGS continually strives to improve the value of its publications to users. Constructive comments and suggestions by readers of the Minerals Yearbook are welcomed.

Suzette M. Kimball, Director

Contacts

Information about the U.S. Geological Survey, its programs, staff, and products may be accessed on the Internet at http://www.usgs.gov or by contacting the Earth Science Information Center at 1–888–ASK–USGS. For specific information about this publication, contact the Director, National Minerals Information Center, by mail at U.S. Geological Survey, 12201 Sunrise Valley Drive, 988 National Center, Reston, VA 20192, or by email at nmicrecordsmgt@usgs.gov, or by calling (703) 648–4961. Additional minerals information may be accessed at http://minerals.usgs.gov/minerals/.

Acknowledgments

The Country Specialists in the National Minerals Information Center, U.S. Geological Survey, in preparing the International Review regional books of volume III of the Minerals Yearbook, extensively use statistics and data on mineral production, consumption, and trade provided by various foreign Government minerals and statistical agencies through various official publications. The cooperation and assistance of these organizations are gratefully acknowledged. Statistical and informational material was also obtained from reports of the U.S. Department of State, United Nations publications, and the domestic and foreign technical and trade press. Of particular assistance were reports submitted by the Resource Reporting Officers and other officers of the Department of State in U.S. Embassies worldwide. Their contributions are sincerely appreciated. Internal statistical support was provided by the staff of the Data Collection and Coordination Section of the National Minerals Information Center.

The regimes of some countries reviewed in this volume may not be recognized by the U.S. Government. The information contained herein is technical and statistical in nature and is not to be construed as conflicting with or being contradictory of U.S. foreign policy.

The staff of the National Minerals Information Center gratefully acknowledges the invaluable contributions that John H. DeYoung, Jr., has made to the quality of the Minerals Yearbook as Scientist Emeritus at the National Minerals Information Center.

Steven M. Fortier
Director, National Minerals Information Center

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THE MINERAL INDUSTRIES OF LATIN AMERICA AND CANADA

By Susan Wacaster, Philip M. Mobbs,[1] Alberto Alexander Perez, Yadira Soto-Viruet, Glenn J. Wallace, and David R. Wilburn

The countries and territories that are covered in this volume have a land area of 30.5 million square kilometers and a combined population of 652 million people, or about 9% of the world total in 2013 (table 1). (These figures do not include the population or land area of the United States, although those figures are included in the totals for the Americas in table 1.) Some countries of the Latin America and Canada region (LAC)[2] were major producers and exporters of metallic and industrial minerals, mineral fuels, and related materials. In terms of trends in the value of the mineral sector's contribution (including gas and oil) to real gross domestic product (GDP), that of the countries of the Caribbean decreased slightly in 2013, as it had each year since 2010, to 15% compared with 15.5% in 2012; that of Canada, which varied by 0.5% or less each year since 2008, increased to 7.2% of the total in 2013 or by 0.2% compared with that in 2012; that of Latin America, which varied by 0.2% or less each year since 2010, decreased to 5.9% in 2013; and that of Latin America and the Caribbean as a whole, which varied by less than 0.1% (usually decreasing) each year since 2008, increased to 6% in 2013 (Mining Association of Canada, 2014, p. 11; Comisión Económica para América Latina y el Caribe, 2015).

The roles of many countries in Latin America and the Caribbean in the global mineral industry were as suppliers of metallic mineral ores and concentrates and of other minerals in crude form, and some countries were suppliers of refined mineral products. In 2013, Bolivia was among the top five producers of mined tin in the world. Brazil was the third-ranked producer of iron ore and one of the top five producers of mined bauxite and tin. Canada was the leading producer of mined potash; the third-ranked producer of mined bauxite and nickel; and one of the top five producers of gem-quality diamond, palladium, and platinum. Chile was the leading producer of mined copper and the second-ranked producer of refined copper in the world. Peru was one of the top five producers of mined copper, gold, lead, tin, and zinc in the world and was among the top five producers of tin metal. Mexico was among the top five producers of mined lead in the world (U.S. Geological Survey, 2015, p. 27, 49, 63, 67, 85, 91, 109, 121, 123, 169, 187).

Acknowledgments

The U.S. Geological Survey (USGS) acknowledges and expresses its sincere appreciation to the following organizations for providing mineral production statistics, basic economic data, and exploration and mineral-related information:

- Argentina—Dirección Nacional de Minería;
- The Bahamas—Department of Statistics;
- Belize—Geology and Petroleum Department;
- Bolivia—Ministerio de Minería y Metalurgia, Instituto Nacional de Estadistíca (INE), and Asociación Nacional de Mineros Medianos;
- Brazil—Departamento Nacional de Produção Mineral, Serviço Geológico do Brasil, and Instituto Brasileiro de Mineração;
- Canada—Natural Resources Canada and the Mining Association of Canada;
- Chile—Comisión Chilena de Cobre and Servicio Nacional de Geología y Minería;
- Colombia—Unidad de Planeación Minero Energética and Instituto Colombiano de Geología y Minería;
- Costa Rica—Dirección de Geología y Minas;
- Dominican Republic—Dirección General de Minería and Servicio Geológico Nacional;
- Guatemala—Ministerio de Energía y Minas, Dirección General de Minería, and Departamento de Desarrollo Minero;
- Guyana—Guyana Geology and Mines Commission;
- Jamaica—Mines and Geology Division of the Ministry of Agriculture and Lands;
- Mexico—Servicio Geológico Mexicano and Secretaría de Economía;
- Nicaragua—Ministerio de Energía y Minas;
- Paraguay—Dirección de Recursos Minerales;
- Peru—Ministerio de Energía y Minas and Instituto Geológico Minero y Metalúrgico; and
- Trinidad and Tobago—Ministry of Energy and Energy Affairs.

General Economic Conditions

Some countries of the LAC continued to be affected by decreasing international prices for some mineral commodities in 2013, including aluminum, coal, copper, gold, nickel, petroleum, silver, and zinc. Fluctuating international petroleum prices in recent years had different effects on the economies of individual countries owing to the disparate nature of these economies in terms of the magnitude and the degree of structural integration into international markets. In 2013, the gross domestic product based on purchasing power parity (PPP GDP) of Canada was $1.5 trillion; that of Latin America and the Caribbean was about $9 trillion; and that of the LAC was $10.5 trillion, or about 9% of the world total. The real GDP rate of growth of Latin America was 2.9% in 2013, as was that of Latin America and the Caribbean combined; that of the Caribbean alone was 1.3%. From 1990 through the mid-2000s, despite varying overall historic trends in the year-on-year rate of growth of the GDP between the Caribbean and Latin America subregions (the Caribbean experienced greater overall long-term positive growth, whereas Latin America experienced fluctuating growth and contraction), the values for both subregions increased to their highest values in the mid-2000s (about 8% in 2006 for the Caribbean and 6% in 2004 for Latin America) owing in part to increased international mineral commodity prices. In 2009, however, the GDP rates of growth decreased to their lowest values (-1.2% for Latin America and –3.4% for the Caribbean) owing to the financial crisis in the United States and the global recession. Since 2010, a year when the economic growth of both subregions rebounded to some degree relative to 2009, the rate of growth of Latin America's real GDP decreased steadily to 2.9% in 2013 from 6.3% in 2010; that of the Caribbean, however, increased steadily to 1.3% in 2013 from 0.2% in 2010 (table 2; Comisión Económica pare América Latina y el Caribe, 2015).

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[1] Deceased

[2] The countries and territories that are covered in this volume include Canada, and the countries of the Caribbean, Central America, and South America, but do not include the United States. Information is provided for subregions, including Canada, the Caribbean, Latin America, and Latin America and the Caribbean (combined). The Latin America subregion includes the countries of Central America and South America. Where data are provided for all the countries covered in the volume, the region is referred to as Latin America and Canada (LAC).

In 2013, Paraguay had the region's leading rate of growth in terms of the PPP GDP, which increased to 13.6% compared with -1.2% in 2012, as the country's agricultural sector (the leading sector of the economy) rebounded from severe drought conditions. The mining sector in Paraguay, however, had not contributed more than 0.2% to the country's real GDP in any year since at least 1990. The rate of growth of the PPP GDP of Panama, which led the region in 2012, was the region's second ranked in 2013, having decreased to 8.4% from 10.8% in 2012 as the construction phase of the Panama Canal extension neared completion. The expansion project, which began in 2007, was expected to be completed in 2016. The mining sector in Panama, which accounted for 1.2% of the country's real GDP in 2013, accounted for 1% or less of the country's real GDP annually from 1990 until 2013. The sector's share of real GDP was expected to increase with the commencement of commercial production at First Quantum Minerals Ltd. of Canada's Cobre Panama copper mine in 2017 (table 2; Comisión Económica para América Latina y el Caribe, 2015).

The rate of growth of the PPP GDP of Bolivia was 6.8% in 2013 compared with 5.2% in 2012. The country's mining and mineral processing industries accounted for 14.3% of real GDP in 2013 and for at least 11.8% of real GDP every year since at least 1990. The rate of growth of the PPP GDP of Colombia was 4.7% in 2013 compared with 4.0% in 2012. The mining and mineral processing industries in Colombia accounted for 9.2% of real GDP in 2013, which was the same as in 2012, and ranged between 6.7% and 10.9% between 1990 and 2012. The rate of growth of the PPP GDP of Mexico decreased to 1.1% in 2013 from 4.0% in 2012 owing to decreased domestic and external demand. The mining and mineral-processing industries' share of the annual real GDP in Mexico decreased steadily to 6.4% in 2013 from 10.3% in 1990. In 2013, the rate of growth of the PPP GDP of Peru was 5.8%, and its mining and mineral processing industries represented 11.2% of the country's real GDP. The rate of growth of the PPP GDP of Venezuela was 1.3% in 2013 compared with 5.6% in 2012, and the decrease was owing in part to decreased international prices for crude petroleum. The mining and mineral processing industries' share of real GDP (including gas and petroleum) in Venezuela remained among the region's highest (second after Trinidad and Tobago) at 24.8% in 2013; however, the sector's share in the GDP decreased steadily from 42.1% in 2003. The PPP GDP of the Dominican Republic was 4.6% in 2013, and the country's mining and mineral processing industries' share of real GDP more than doubled to 1.9% from 0.8% in 2012. Although the rate of growth of the PPP GDP of Trinidad and Tobago in 2013 was 1.6% compared with 1.2% in 2012, the country's mineral industries accounted for 39.1% of real GDP in 2013, and ranged from between 26.4% and 42.3% from 1990 to 2012. The economies of Brazil and Mexico combined accounted for 48% of the value of the LAC region's total PPP GDP in 2013 (table 2; Mining Association of Canada, 2014, p. 16; Comisión Económica para América Latina y el Caribe, 2015).

The rate of growth of the PPP GDP of Canada was 2.0% in 2013 compared with 1.7% in 2012 (table 2). Canada was one of the world's leading mineral producers, with mining operations in more than 100 countries of the world, and the mineral industry contributed greatly to Canada's economic strength. Canada's mining and mineral-processing industries represented 7.2% of its real GDP in 2013 and accounted for between 6.9% and 7.2% of the nominal GDP from 2008 through 2012. Five of Canada's top 10 spots for international operations were in Latin American countries in 2013, and companies listed on the Toronto Stock Exchange and the Venture Exchange raised about $940 million[1] in equity capital for Latin American mining projects in 2013. The Canadian mineral industry employed more than 380,000 employees domestically in mineral extraction, smelting, fabrication, and manufacturing. In 2013, Canadian mining companies invested $533 million in research and development (R&D) and employed 4,700 people in R&D, which was greater than R&D employment in the pharmaceutical and forestry sectors, both of which receive extensive financial and policy support from the Government of Canada (table 2; Mining Association of Canada, 2014, p. 6–7, 73).

In 2013, the value of goods exported from Canada increased by 3.7% compared with that of 2012 to $481.5 billion, of which energy products accounted for 24.5% (a 6.8% increase compared with that of 2012), metal ores and nonmetallic minerals accounted for 3.8% (a 2.9% decrease compared with that of 2012), and metals and nonmetallic mineral products accounted for 11.2% (a slight increase compared with that of 2012). Approximately one-half of Canada's mineral and metal exports, by value, were received by the United States in 2013. The mineral sector of Canada occupied a significant and, in some cases, increasing share of export earnings for many nations of Latin America and the Caribbean. Several trade blocs promoted trade in the subregion, including the Asociación Latinoamericana de Integración (ALADI), the Comunidad Andina (CAN), the

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[1] Where necessary, values have been converted from Canadian dollars (CAN) to U.S. dollars (US$) at an average exchange rate of CAN1.00=US$0.98 in 2013.

Mercoado Comun Centroamericano (MCCA), and the Mercado Comun del Sur (MERCOSUR) (Ministry of Foreign Affairs, Trade and Development, 2015).

Legislation

The President of Bolivia signed a new law in 2013, the Law of Mining Rights (Law 328), that increased the state's expropriation powers over the mining sector in order to regain control of mines deemed by the Government to be idle, inactive, or unproductive. Other instances whereby licenses would revert to the state include absence of registration, absence of an implementation plan, and a mining company's refusal to migrate contracts to modalities featured in an upcoming new mining law. The new legislation allows the Government to take over 70% of the current 2,454 mining licenses covering 1.5 million hectares held by private owners. The Vice Ministry of Regulation, Auditing, and Mining Policy was assigned the task of determining the status of a mining concession. Areas occupied by cooperatives or local groups would not be targeted for expropriation (Ernst & Young Global Ltd., 2013; Osler, Hoskin & Harcourt LLP, 2013; Mayer Brown LLP, 2014).

In June 2013, the Government of Brazil proposed a bill (The New Mining Code) to revise the country's Mining Code of 1967. Provisions of the bill would increase state authority and revenue. The President of Brazil sought to fast track the legislation through the National Congress, but controversy emerged among the Government, private industry, labor unions, and the general public. Numerous amendments were made to the bill by a special commission of the National Congress, but the bill had not been passed into law by yearend 2013. Provisions of the new code would dissolve the Departamento Nacional de Política Minerária (the National Department of Mining Policy) (DNPM) and would create a regulatory agency called the Agencia Nacional de Mineracao [the National Mining Agency] (ANM), which would regulate and supervise the mining sector as well as create a Conselho Nacional de Políticas de Mineração (National Council of Mining Policies) (Ernst & Young Global Ltd., 2013; Osler, Hoskin & Harcourt LLP, 2013; Mayer Brown LLP, 2014).

A main point of contention in the new mining bill was its challenge to the first-come-first-served policy that exists for granting mining rights. The Government of Brazil proposed to replace this method with a public bidding process that would be organized by the ANM. The Government claimed that the first-come-first-served policy resulted in decreased exploration of potential mining areas by mining companies because the mining rights could be held by companies that had neither the intention nor the means to develop the concession. Some among the private mining sector claimed that the bidding process would decrease mining exploration activities because the bidding process would rely on the state's initiatives. Amendments to the bill presented by the special commission restricted the bidding process to the mining titles that the Government already held for sites where there were proven, commercially viable mineral deposits and required mining companies to comply with the minimum levels of activity. Negotiations were ongoing among the Government, the National Congress, and the mining companies at yearend (Osler, Hoskin & Harcourt LLP, 2013; Mayer Brown LLP, 2014).

Another regulatory change initially proposed by the Government was the unification of exploration licenses and exploitation licenses into one mining license. The unified mining license would delimit an exploration phase during which mining companies would have to comply with minimum exploration obligations to be established in a concession contract and would have a maximum term of 40 years that would be renewable indefinitely in 20-year increments as long as the requirements of the concession contract had been upheld. The amended bill also proposed a fixed maximum term of 6 years for the exploration license and a maximum 30-year term for a production license that could be renewed indefinitely in 15-year increments, provided the contract terms had been upheld (Osler, Hoskin & Harcourt LLP, 2013; Mayer Brown LLP, 2014).

The Government's proposed new mining code would require that royalties from mineral exploitation be levied on gross revenue rather than on net revenue of mineral sales and would allow for the value of other taxes levied on the commercialization of mineral production to be deducted from the amount of royalties owed. A fixed range of royalties (a royalty band system) was proposed; the maximum royalty rate proposed was 4% for iron ore (as opposed to 3% previously), and other royalties would be fixed by decree. The National Congress's special committee eliminated the band system and proposed that royalty rates be established by the National Congress within the Mining Code (Osler, Hoskin & Harcourt LLP, 2013; Mayer Brown LLP, 2014).

On October 30, 2013, the National Assembly of the Canadian Province of Quebec blocked a bill titled Mining Act (Bill 43), which proposed replacing the existing Quebec Mining Act that was enacted in 1987. On December 5, a bill titled An Act to Amend the Mining Act (Bill 70) was passed with some requirements of Bill 43 having been withdrawn. Proposed changes to the Mining Act included, but were not limited to, such requirements for mining companies as a project feasibility study and a scoping and market study to accompany an application for a mining lease; the proven ability to cover 100% of the estimated cost of mine-site rehabilitation and restoration; a 3-year limit to begin rehabilitation and restoration work after operations cease, unless an extension is granted by the Minister of Natural Resources; completion of an environmental impact assessment for metal or asbestos ore-processing projects where the processing capacity is 2,000 metric tons per day or greater; and the power of municipalities to declare any area as incompatible with mining in their land-use development plans and the inability of Ministers to request changes to those plans (Davies, Ward, Phillips & Vineberg LLP, 2013; Osler, Hoskin & Harcourt LLP, 2013).

Ecuador's legislature passed a new mining law in 2013 that determined a system for mining royalties based on the size of the project. Small-scale mines would pay 3% of sales in royalties, medium-scale projects would pay 4%, and large-scale projects would pay 5%. A mine included in the newly created medium-scale category would pay the Government 50.1% of its net profits from mining. Kinross Gold Corp. of Canada announced plans to discontinue development of the Fruta del Norte gold-silver deposit after it failed to reach an agreement with the Government on key economic and legal terms (Keen, 2013).

In 2013, the Government of Guatemala announced that it would introduce a bill calling for a 2-year mining moratorium on new mining licenses. It was unclear whether the bill was introduced or approved, but reports indicated that, if approved, the measure might lead to the reform of current mining legislation, including increased royalty rates, increased community engagement, and increased state participation in the sector when the moratorium ended (Ernst & Young Global Ltd., 2013).

In 2013, the Government of Mexico passed a broad-based tax reform bill into law that became effective on January 1, 2014, and had implications for mining companies operating in Mexico. The tax reform package required a mining royalty, an additional mining duty, or an extraordinary mining duty to be levied on owners of mining concessions. A mining royalty of 7.5% would apply to net profits, which was determined similarly to general taxable income. Interest income, annual inflation adjustments, and quantities of cash greater than $46,000 (received as loans, future capital increase contributions, or capital increases), however, would not be considered as income, and tax deductions were not available for interest income accrued in the tax year, for investments in fixed assets, or for the annual inflation adjustment (with exceptions). Mining concessionaires that failed to carry out exploration and exploitation activities for 2 continuous years within the first 11 years of holding a concession title would pay an additional charge equal to 50% of the maximum mining fee allowed under the Federal Government Fees Law, which in 2013 was $10 per hectare; after the 12th year, the additional mining fee would increase to 100% of the maximum mining fee per hectare. Owners of mining concessions would be required to pay an additional 0.5% tax on gross income derived from the sale of gold, silver, and platinum (Deloitte Global Services Ltd., 2013; Ernst & Young Global Ltd., 2013).

The Chamber of Deputies of Uruguay passed a mining law in 2013 to regulate large-scale mining projects after approval in the Senate, and Federal Government approval of the law was pending at yearend. The law would affect projects with a surface area greater than 400 hectares or with an investment of more than $100 million. The law would require companies with large-scale mining projects to pay an annual fee (unspecified), a 25% corporate income tax, and an additional profit tax linked to international mineral prices, which would range from 0% to 38%. The law would also require mining firms to have a mine-closure plan that included the creation of tourist spaces or reservoirs (Ernst & Young Global Ltd., 2013).

Exploration

Mineral exploration activity in Latin America and the Caribbean decreased in 2013 compared with that of 2012 in terms of the number of exploration sites. Although the exploration budget for Latin America and the Caribbean decreased by 26% to $3.8 billion from $5.2 billion in 2012, Latin America and the Caribbean continued to be the leading region in the world for exploration activity based on budget data. Approximately 56% of the deposits actively explored in 2013 in Latin America and the Caribbean contained gold or silver and 29% contained base metals or some combination of precious and base metals. Exploration activity in 2013 was primarily used to further define early-stage discoveries (65%), conduct exploration at a producing site (20%), conduct prefeasibility and feasibility studies of economically promising prospects (8%), and further explore for resources at deposits under development (7%). Major companies accounted for about 60% of Latin America's exploration budget; junior companies, about 26%; intermediate companies, about 11%; and other types of companies, 3%. Approximately 35% of Latin America's exploration budget was targeted for activity near an existing mine site, 34% was for late-stage and feasibility activity, and 31% was for grassroots or early-stage activity (table 3; Wilburn and Stanley, 2014, p. 32).

Globally, Canada had been either the leading or the second-ranked destination for mineral exploration since the mid-1980s. In 2013, exploration for precious metals (gold and silver) accounted for $1.15 billion; base metals, $430 million; uranium, $175 million; iron ore, $115 million; and diamond, $82 million of the country's $2.4 billion exploration total. Company exploration spending for 2013, as reported by the Canadian Government as of March 2014, was greatest in Ontario (26% of the total exploration and deposit appraisal expenditures for Canada), British Columbia (22%), Quebec (14%), Nunavut Territory (12%), Saskatchewan (9.1%), and Newfoundland and Labrador (4.5%). The only Canadian Province with an increase in exploration activity in 2013 compared with the level in 2012, based on reported expenditures, was New Brunswick, which had a modest 1.4% increase, primarily as a result of increased exploration for gold and other metals. All other Canadian Provinces and Territories showed a decrease in exploration expenditures of at least 15% in 2013 compared with those of 2012. Senior exploration companies accounted for about 59% of total exploration expenditures in 2013, which was a 52% increase compared with their expenditures in 2012. In terms of mineral commodities sought countrywide, precious metals received the largest exploration expenditure (48%), followed by base metals (18%), uranium (7%), iron ore (5%), and diamond (3%) in 2013. Other mineral commodities made up the remaining 19%. Canadian Provinces or Territories with the greatest amount of exploration activity were, in descending order by number of sites in 2013 as compiled by the USGS, Quebec, Ontario, British Columbia, Saskatchewan, Newfoundland and Labrador, New Brunswick, Manitoba, Yukon Territory, Northwest Territories, and Nunavut Territory. Based on the site data, 60% of the exploration sites were targeted at precious metals; 15%, base metals; 6%, iron ore; 6%, uranium; 4%, graphite; 3%, rare-earth elements; and 2% (each), diamond, lithium, and potash in 2013. Approximately 82% of all reported exploration sites were considered early-stage sites (Mining Association of Canada, 2014, p. 36; Wilburn and Stanley, 2014, p. 35–36).

Consultation with First Nations was considered a significant issue by the Canadian Government, nongovernment organizations, and the mineral industry. As many as 600 mineral resource projects were under consideration for development during the next 10 years in Canada, and many of them are located within 100 kilometers of aboriginal communities. Each Province had established, or was in the process of establishing, procedures for consulting and negotiating with First Nations groups, but differences in these procedures had led to confusion and project development delays. The issue of unsettled land claims was considered the single most important barrier to mining investment in British Columbia based on information collected by the Fraser Institute (Wilburn and Stanley, 2014, p. 36).

Investment and Spending Data

Net foreign direct investment (FDI) in Latin America and the Caribbean was $188.1 billion in 2013, which was a 6% increase compared with that of 2012. FDI in Latin America and the Caribbean as a percent of GDP had increased rapidly since 2009. Reinvested earnings had accounted for a large share of the FDI in the past few years, but in 2013, capital contributions accounted for 42% of total FDI in the region; reinvested earnings, 38%; and intercompany loans, 20%. In 2013, Brazil was the leading recipient of FDI in the region, followed by Mexico and Chile. Inward FDI in Brazil was $64.1 billion, or 2% less than in 2012 (Brazil did not include reinvested earnings in its FDI figures); that of Mexico was $38.3 billion, which was more than twice the amount received in 2012; and that of Chile was $20.3 billion, or 2% less than in 2012. Other countries in the region that had high percentage increases in FDI compared with that of 2012 included Suriname (86%), Panama (61%), and Bolivia (35%). Inward FDI for Central America increased by 21%, whereas that of the Caribbean region decreased by 31%. The United States was the leading investor in Latin America and the Caribbean, accounting for 30% of inflows to Central America and 32% of inflows to Mexico. Europe was the leading investor in Mexico, Brazil, and Colombia, accounting for 54%, 46%, and 30% of FDI inflows, respectively. In the Latin America and Caribbean region, natural resources received 26% of total FDI, but there were wide variations among individual countries. FDI in natural resources in the Latin America and the Caribbean region was dominated by the hydrocarbon and mining industries in 2013, and FDI in mining had increased since the mid-1990s, notably in Brazil, Chile, Colombia, the Dominican Republic, Mexico, and Peru (Economic Commission for Latin America and the Caribbean, 2014, p. 9–10).

In Argentina, restrictions on access to foreign currency, which were introduced in 2011 to prevent capital flight, led to an increase in reinvested earnings. In 2013, reinvested earnings accounted for 77% of total FDI inflows, although the value of those earnings reportedly decreased by 14% compared with that of 2012. Mergers and acquisitions included the sale of Companía General de Combustibles to a private investor for $200 million. In early 2014, the Government of Argentina reached an agreement with Repsol S.A. of Spain to pay $5 billion in compensation for the 2012 nationalization of its 51% share in the Argentinian energy company Yacimientos Petrolíferos Fiscales (Economic Commission for Latin America and the Caribbean, 2014, p. 35–36).

In Brazil in 2013, the value of FDI directed towards natural resources, which increased to $10.9 billion, or by more than 50% compared with that of 2012, was driven by expansions in the petroleum industry. A consortium led by Royal Dutch Shell plc of the Netherlands, Total S.A. of France, and China National Petroleum Corp. of China won a bid to develop the Libra Deepwater oilfield in partnership with Petróleo Brasileiro S.A. with a signing payment of $7 billion and future investments of $200 billion expected during the next 35 years. The mineral industry received $3.3 billion in total FDI in 2013 (Economic Commission for Latin America and the Caribbean, 2014, p. 35).

In Bolivia, net FDI increased by 35% to about $2 billion, most of which was directed towards exploration for and processing of hydrocarbons. Petroleo Brasileiro S.A. of Brazil (the primary venture partner of Bolivia's state-owned oil and gas company Yacimientos Petrolíferos Fiscales Bolivianos) won a bid for hydrocarbon resource development that was estimated to require an investment of more than $800 million in 2013. Repsol S.A. of Spain invested $373 million in 2013 to expand its natural gas processing plant, and Samsung Corp. of the Republic of Korea committed $843 million for a petrochemical complex in Bolivia (Economic Commission for Latin America and the Caribbean, 2014, p. 35).

FDI by sector was not available for Chile, but the mineral industry accounted for the largest share of inflows in recent years. The Chilean Copper Commission (COCHILCO) forecasted that more than $112 billion in mining FDI would be received by 2021, of which Canada would account for 27%, and Japan, 10%. Pan Pacific Copper Corp. of Japan's Caserones Mine commenced production in 2013 after an investment of $4.2 billion. Kombinat Górniczo-Hutniczy Miedzi Polish Copper of Poland and Sumitomo Metal Mining of Japan were developing the Sierra Gorda Mine in Sierra that was expected to require about $3.9 billion worth of investment (Economic Commission for Latin America and the Caribbean, 2014, p. 35).

The extractive industries of Colombia received 47% of total inward FDI in 2013, or about $8 billion, including $5 billion directed to the hydrocarbon sector and $3 billion to the mining sector. FDI in Guatemala increased to $1.3 billion in 2013, or by 5% compared with that of 2012. FDI in natural resources in Guatemala accounted for $488 million in 2013, of which $467 million was investment made by the Solway Group of Cypress in the Fenix nickel project. In Mexico, FDI in natural resources accounted for 8% of total inflows, almost all of which was directed to gold-mining activities. In Nicaragua, B2Gold Corp. of Canada announced an investment of $289 million for expansion of La Libertad Mine. In 2013, the Government of Suriname approved Newmont Mining Corp. of Canada's development of the Merian gold mine, which was expected to result in investments of between $800 million and $1 billion. Under the terms of the agreement, a 6% royalty, payable in gold, was granted to the Government of Suriname. Also, Apache Corp. of the United States announced a $230 million investment in Suriname's gas and oil exploration block, Block 53. In Peru, FDI inflows decreased by 17% to $10.1 billion, which was the second greatest amount of FDI received by the country. Official data were not available on FDI by sector, but record FDI inflows to Peru in recent years were driven by large quantities of reinvested earnings from mining companies. In Guyana, Gold Fields Ltd. of Canada announced a $249 million investment in the Aurora gold mine (Economic Commission for Latin America and the Caribbean, 2014, p. 26–27, 35, 37, 39, 40, 43, 46).

In 2013, outward FDI from Latin America and the Caribbean region decreased by 30% compared with that of 2012 to $32.6 billion, which was one of the lowest values since about 2003. The decrease was owing in large part to decreased outflows from Chile and Mexico, and to negative net outflows, or disinvestment in Brazil in 2011, 2012, and 2013. Colombia, however, accounted for $7.7 billion of outward FDI from the region, 19.9% of which was invested in hydrocarbon industries and exploitation of mines and quarries (Economic Commission for Latin America and the Caribbean, 2014, p. 10).

FDI inflows to Canada increased by 9.5% in 2013 to $686.3 billion. The United States was the leading source of FDI to Canada, accounting for about 51% of the total. FDI in Canada's mineral extraction industries, including natural gas and crude petroleum, was about $130 billion. FDI in metal mining in Canada was about $66 billion. Domestic capital spending in the Canadian mineral industry (which included spending on new mine construction, capacity increases, processing and technology improvements, upgrades or expansion of smelters and refineries, mill improvements, energy reconfigurations, and environmental work) decreased by 23% in 2013 compared with that of 2012 to about $19 billion, but this did not include spending on exploration or repairs. About 90% of capital spending in the mineral industry was accounted for by extraction, smelting, and refining. About two-thirds of capital spending in the extraction segment was for construction expenses, and the other one-third was for machinery and equipment. For smelting and refining activities, about one-fifth of spending was accounted for by construction, and the rest was accounted for by spending on machinery and equipment. In Canada in 2013, the total for capital spending on extraction, refining, and smelting (about $19 billion), plus reported exploration spending (about $2 billion), plus spending on repairs (which falls under the spending category of equipment and machinery) (about $4 billion) was $25 billion. Also, in 2013, domestic capital investment in Canada's oil sands increased by about 20% compared with that of 2012 to $34 billion, which was higher than investment prior to the global recession of 2009. Total domestic investment in 2013 in both hard-rock-mineral mining and oil-sand mining in Canada was about $58.6 billion, including repair expenditures in 2013 (Mining Association of Canada, 2014, p. 37–38; Statistics Canada, 2015).

Net outward FDI (stock) from Canada to the world increased by 8% compared with that of 2012 to $784 billion, of which mining investment accounted for 9%; oil and gas extraction, 6%; and support activities for mining and oil and gas extraction, 4%. In terms of net value, the United States was the leading destination for Canada's FDI, as it had been each year since at least 2010, receiving $357.1 billion in 2013, of which 5% was accounted for by oil and gas extraction; 4%, by support activities for mining and oil and gas extraction; and 1%, by mining activities. Net FDI from Canada to the Latin America and the Caribbean region increased by 9% to about $205 billion in 2013, which was the maximum value of Canada's FDI by region. Of that amount, mining accounted for 22%; oil and gas extraction, 5%; and support activities for both segments, 4% (Ministry of Foreign Affairs, Trade and Development, 2015).

Commodity Overview

This section summarizes the supply and demand trends and potential mineral industry developments for the leading mineral commodities in the LAC. The region's share of world production of selected mineral commodities is listed by commodity in table 4. In tables 5 through 20, estimates for production of major mineral commodities for 2015 and beyond have been based upon supply-side assumptions, such as announced plans for increased production or new capacity construction and bankable feasibility studies. The outlook tables in this summary chapter show historic and projected production trends; therefore, no indication is made about whether the historic data are estimated or reported and revisions are not identified. Data on individual countries are labeled to indicate estimates and revisions. Forward-looking information, which includes estimates of future production, exploration and mine development, cost of capital projects, and timing of the start of operations are subject to a variety of risks and uncertainties that could cause actual events or results to differ significantly from expected outcomes. Projects listed in the following section are presented as an indication of industry plans and are not a USGS prediction of what will take place.

Metals

Bauxite and Alumina and Aluminum.—Brazil and Canada continued to be the leading primary-aluminum-producing countries in the LAC in 2013, and production from the two countries accounted for 88% of the total for the region. Canada accounted for 6% of the world's total primary aluminum production, and the combined total production from Brazil and Canada accounted for 9% of world production (table 4). In Canada, Rio Tinto Alcan Inc. shut down the Shawinigan smelter, which was located in Quebec and had an annual production capacity of 100,000 metric tons per year (t/yr). The facility used Söderberg technology, which is a relatively outdated technology that does not comply with current environmental regulations in Quebec. The 72-year-old smelter was closed 1 year earlier than planned owing to weak metal prices (Canadian Press, The, 2013). Also, Alcoa Inc. closed two potlines at its Baie-Comeau facility in Quebec, which accounted for a combined annual production capacity of 105,000 t/yr, owing to increasing prices for power in the Province as well as outdated technology (Thomson Reuters, 2014).

Expanded or newly created production capacity in Canada was expected to compensate for losses owing to closures. Production was expected to increase slightly in the near term if demand from the automotive and aerospace sectors remained high. Low metal prices and high power prices were also the cause of production decreases and capacity losses in Brazil where temporary shutdowns of facilities accounted for a 9% decrease in production for the year. Votorantim Metals Ltda.'s Rodon alumina project was expected to begin construction in 2014 on a 3-million-metric-ton-per-year (Mt/yr) alumina refinery in the State of Para. Commercial operation was scheduled to commence in 2017 (tables 4–6; Alumina Rondon, 2013).

Copper.—Chile and Peru continued to be the leading copper-producing nations in the LAC, and production from the two countries accounted for 83% of the total for the region. Chile was the world's leading copper-producing country, accounting for 32% of global copper content of mine output in 2013, and the combined production from Chile and Peru accounted for 39% of the world total. Mined copper output in Chile increased by 6% in 2013 compared with that of 2012 to 5.9 Mt. The value of exported copper and copper products from Chile decreased by 0.4% to $36.6 billion, whereas the tonnage increased by 6.8% to 5.8 Mt. Mine production in Chile may necessarily increase in the near term to compensate for the downward trend of international copper prices, which decreased steadily (by about 30%) since 2011, and lower copper grades at mines in the country. Other important factors affecting future copper production in Chile included the risk of oversupply if external demand were to decrease and uncertainty as to whether the decreasing cost of energy would contribute to sustained or increased production levels at Chilean copper mines (tables 4, 8; Comision Chilena del Cobre, 2015).

In Peru, copper production increased by 6% in 2013 compared with that of 2012 despite a 6% decrease in production at the Cerro Verde Mine, which was one of the country's largest mines, as expansion work took place to increase annual copper production capacity by about 300,000 t/yr by 2016 (FreeportMcMoRan Copper & Gold Inc., 2014, p. 15). The volume of copper exported from Peru remained nearly constant in 2013 compared with that of 2012, decreasing by 0.3% to 1.4 Mt, whereas the value of exported copper decreased by 9%. The quantity of exported copper was expected to remain constant in 2014, whereas the value derived from exports was expected to decrease. Production in the near term is likely to increase, not only owing to the potential for continued low international copper prices but also owing to scheduled expansions and new capacity at several mines in the country (tables 4, 8; Minesterio de Energia y Minas, 2015, p. 8).

Gold.—By order of quantity produced, Peru, Canada, Mexico, and Brazil were the leading producers of mined gold in the LAC in 2013. The combined total of mined gold from these countries accounted for 64% of the total for the region and 17% of the world total. Preliminary data for mined gold in these countries indicated that production increased by between 15% and 20% in Brazil, Canada, and Mexico compared with that of 2012. In Peru, preliminary data indicate that production decreased by between 3% and 6% in 2013, and the volume of mined gold decreased by 30% since 2006 (Minesterio de Energia y Minas, 2015, p. 4).

Peru's total production decreased primarily because of a 24% decrease in production at theYanacocha Mine as a result of lower grade ore delivered to leach pads as well a decreased rate of recovery at the mill (Newmont Mining Corp., 2014, p. 74). The downward trend in Peru's gold production was expected to continue at least until 2017 as aging mines continued to process lower grade ores and as the Government attempted to limit informal mining (Taj and Cespedes, 2014). Some small mines were expected to come on line in 2018 or later that would contribute to a rebound in production. Peru's gold exports decreased by 2% in 2013 compared with those of 2012 to 184 t, and the value of exported gold decreased by 14%. The value of gold exports from Peru decreased each year since 2011 for a cumulative decrease in value of 37% between 2011 and yearend 2013 (Minesterio de Energia y Minas, 2015, p. 8). The value of Peru's gold production, therefore, was expected to decrease until new mine production commenced (tables 4, 10).

By value of mineral production, gold was Canada's third-ranked mineral product after potash and coal in 2013. The value of mined gold in 2013 was $5.9 billion, and the value of gold exports, which was the leading mineral export by value, was $17.7 billion (Mining Association of Canada, 2014, p. 28). The gold metal contained in proven and probable minable ore in operating mines and deposits committed to production in 2011 (the most recent year for which data were available) was 2,044 t, which was an increase of 39% compared with that of 2010 and a 123% increase cumulatively since 2009 (Mining Association of Canada, 2014, p. 28). Preliminary data indicated that the quantity of gold produced in 2013 increased by 20% compared with that of 2012 and the increase was attributed in large part to the startup of the Detour Lake Mine, which produced about 7 t of gold during 11 months of production (Detour Gold Corp., 2015, p. 5).

Feasibility studies had been completed or construction had started on numerous gold mine projects in Canada by early 2014. Total mineral exploration and deposit appraisal expenditures in Canada, however, decreased by 40% in 2013 compared with those of 2012 and by 45% cumulatively from 2011 to yearend 2013 as the price of gold decreased by 17% between 2011 and 2013. Production was expected to continue to increase moderately in the near term in Canada as it had each year since 2009 (tables 4, 10; Mining Association of Canada, 2014, p. 28, 39).

Iron Ore.—Iron ore production in the LAC decreased by 9% in 2013. Brazil was the region's main iron-ore-producing country, accounting for 79% of the total in 2013, the same percentage as in 2012; the regional decrease was primarily owing to a 5% decrease in Brazil's output to 246 Mt (table 11). Iron ore production in Brazil was conducted primarily in the States of Mina Gerais (52%) and Para (32%). Brazil's iron ore exports totaled 295.5 Mt in 2013 compared with 296.1 Mt in 2012, accounting for 88.9% of the country's mineral sector exports, 13% of the country's total exports, and about 25% of the global market share of trade in iron ore (Gilroy, 2015). The country's iron ore exports generated revenues of $32.5 billion, which was an increase of 4% compared with revenues in 2012 (Barbosa, 2014). Vale S.A. accounted for 77% of the country's production of iron ore in 2013. Shipments were expected to remain high in the near term despite Vale's plan to eliminate about 30 million metric tons of high-cost capacity from its Brazilian operations as the company was ramping up its S11D project in Para, which was expected to add nearly 100 Mt/yr of ore by 2018 (tables 4, 11; Sindicato Nacional da Indústria da Extraçao de Ferro e Metals Básicos, 2015, p. 4).

Platinum-Group Metals.—Canada and Colombia continued to be the only countries to produce palladium and (or) platinum in the LAC in 2013. Canada produced about 16,000 kilograms (kg) of palladium, of which 4,200 kg came from the Lac des Isles Mine (a decrease of 21% compared with the amount in 2012). The mine, which was also the country's leading platinum-producing mine, produced about 300 kg of platinum (a decrease of 9% compared with the output in 2012). Palladium and platinum produced in Canada came from primary production and as a byproduct of production at base-metal operations. Canada's production of platinum-group metals increased modestly to 24,636 kg in 2013 from 22,337 kg in 2011. The average price of palladium in 2013 was higher than in 2012 as supply was constrained owing in part to labor strikes in South Africa. Platinum and palladium production in Canada was expected to increase only slightly in the near term (tables 14 and 15; North American Palladium Ltd., 2014, p. 6).

Colombia produced about 1,836 kg of platinum primarily from small-scale operations in Choco Department. Reported production of platinum from Colombia followed trends of international prices for precious metals. Platinum production in Colombia was not expected to increase in 2014 (table 1).

Tin.—Brazil, Bolivia, and Peru were the only tin-producing countries in the LAC in 2013. Peru was the leading mined-tin-producing country in the LAC, followed by Bolivia and Brazil. The combined total production from these three countries accounted for 21% of the world total. Peru's production of mined tin accounted for 40% of the regional total in 2013; Bolivia, 32%; and Brazil, 28% (tables 4, 16).

Canada was not a tin-producing country, but tin exploration projects were underway in the Provinces of New Brunswick, and Nova Scotia, and in the Northwest Territories, including the East Kemptville project (wholly owned by BHP Billiton Ltd.), the Mount Pleasant project (wholly owned by Adex Mining Inc. of Canada), and the Wrigley project (majority owned by Glencore plc of Switzerland). Although both the East Kemptville and the Mount Pleasant projects achieved limited production in the 1980s, they were also in the early stage of reserves development in 2013 for the potential production of multiple commodities, including indium, molybdenum, tungsten, and zinc.

Minsur S.A. of Peru was reported to be the world's third-ranked tin producer. The company announced that it planned to invest as much as $2 billion in deposits in Brazil and Peru. In 2013, Minsur produced about 11% of the world's tin output from the San Rafael Mine in Peru, and the remainder came from the Mineração Taboca Pitinga Mine in Brazil. Minsure announced plans to process tailings at San Rafael to add as much as 7,000 t/yr of tin to its production total. The volume of production from tin mining in the region was not expected to increase in the near term as the depletion of reserves at San Rafael was likely to result in lower tin content of mine production starting in 2017. As of mid-2013, expansion projects in Bolivia were behind schedule (ITRI Ltd., 2013a, b).

Industrial Minerals

Diamond.—Canada continued to be the leading diamond producer in the LAC in 2013 (table 18). Minor producers in the region included Brazil, Guyana, and Venezuela. Canada produced about 10.7 million carats of diamond in 2013, which was an increase of just 0.3% compared with that of 2012. The value of diamond production in the country had decreased significantly in recent years to about $2.0 billion in 2013 compared with about $2.4 billion in 2010, but the commodity continued to be one of Canada's top mineral products by value of production. The decreased value of diamond production was attributable to decreased demand as well as a potential excess global supply. The Northwest Territories was the country's dominant source of diamond, followed by Ontario and Nunavut. Despite declining exploration spending in Canada's diamond sector, several development projects were under way, including the Stornoway Diamond Corp.'s Renard Diamond project, which was on track to become the first diamond mine in Quebec when construction commenced in July 2014. As of February 2013, the Renard deposit had estimated proven and probable reserves of 17.9 million carats (Stornoway Diamond Corp., 2013, p. 7; Mining Association of Canada, 2015, p. 12, 22).

Lithium.—Chile continued to be the leading lithium-producing country of the LAC in 2013, accounting for 77% of the region's estimated production and 40% of global production in 2012. Bolivia, Chile, and Argentina were the top-ranked countries in the world in terms of estimated shares of lithium resources, accounting for 24%, 22%, and 19%, respectively, of the world total. About 60 identified salt flats are located in northern of Chile, the most important of which also contain potassium and boron. About 70% of lithium occurrences in Chile are associated with brines of the salt flats in the northwestern part of the country, and the remainder are associated with pegmatite structures, which are more common sources of such lithium-containing minerals as lepidolite and spodumene that are found in other regions of the world. By 2020, total projected production capacity in terms of lithium carbonate equivalent was expected to increase nearly twofold compared with global capacity in 2013. Argentina was expected to surpass Chile in terms of installed capacity by 2017 as Argentina's installed lithium-carbonate-equivalent capacity was projected to increase until at least 2020, whereas that of Chile was expected to level out in 2016 and remain constant until at least 2020 (Comision Chilena del Cobre, 2013; p. 27; Cubillos, 2014, p. 2, 14).

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TABLE 1
THE AMERICAS: AREA AND POPULATION IN 2013

Region and country	Area[1] (square kilometers)	Estimated population[2] (thousands)
North America:		
Canada	9,984,670	35,158
Mexico	1,964,375	122,332
United States[3]	9,826,675	316,129
Total	21,775,720	473,619
Central America and the Caribbean:		
Antigua and Barbuda	443	90
Aruba	180	103
Bahamas, The	13,880	377
Barbados	430	285
Belize	22,966	332
Bermuda	54	65
Costa Rica	51,100	4,872
Cuba	110,860	11,266
Curacao[4]	444	154
Dominica	751	72
Dominican Republic	48,670	10,404
El Salvador	21,041	6,340
Grenada	344	106
Guadeloupe[5]	1,704	453
Guatemala	108,889	15,468
Haiti	27,750	10,317
Honduras	112,090	8,098
Jamaica	10,991	2,715
Martinique[5]	1,100	401
Montserrat	102	5 [6]
Nicaragua	130,370	6,080
Panama	75,420	3,864
Saint Kitts and Nevis	261	54
Saint Lucia	616	182
Saint Vincent and the Grenadines	389	109
Sint Maarten[4]	34	40
Trinidad and Tobago	5,128	1,341
Other[7, 8]	17,476	3,882
Total	763,483	87,475
South America:		
Argentina	2,780,400	41,446
Bolivia	1,098,581	10,671
Brazil	8,514,877	200,362
Chile	756,102	17,620
Colombia	1,138,910	48,321
Ecuador	283,561	15,738
French Guiana[5]	90,000	202
Guyana	214,969	800
Paraguay	406,752	6,802
Peru	1,285,216	30,376
Suriname	163,820	539
Uruguay	176,215	3,407
Venezuela	912,050	30,405
Total	17,821,453	406,689
Americas total	40,360,656	967,783
World total	510,072,000	7,125,000

[1] Source: U.S. Central Intelligence Agency, The World Factbook.

[2] Source: The World Bank, 2014 World Development Indicators Database.

[3] Excludes Puerto Rico and U.S. Virgin Islands.

[4] Netherlands Antilles was dissolved in October 2010. Curacao and Sint Maarten became autonomous territories of the Kingdom of the Netherlands.

TABLE 1—Continued

THE AMERICAS: AREA AND POPULATION IN 2013

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[5] Source: Embassy of France, Washington, D.C.

[6] Source: U.S. Census Bureau

[7] Includes Anguilla, Bonaire, British Virgin Islands, Cayman Islands, Puerto Rico, Saba, Sint Eustatius, Turks and Caicos Islands, and U.S. Virgin Islands.

[8] Source: Statistics Netherlands—The Caribbean, Netherlands in Figures 2012; U.S. Central Intelligence Agency, The World Factbook 2014; and U.S. Census Bureau.

TABLE 2
THE AMERICAS: GROSS DOMESTIC PRODUCT[1, 2]

	Gross domestic product in 2013 based on purchasing power parity		Real gross domestic product growth rate (percentage)		
Region and country	Gross value (million dollars)	Per capita (dollars)	2011	2012	2013
North America:					
Canada	1,518,410	43,253	2.5	1.7	2.0
Mexico	2,058,900	17,390	4.0	4.0	1.1
United States	16,768,050	53,001	1.6	2.3	2.2
Total	20,345,360	42,957 [3]	2.3 [4]	2.7 [4]	1.9 [4]
Central America and the Caribbean:					
Antigua and Barbuda	1,920	21,967	-1.9	3.6	1.8
Bahamas, The	8,780	24,648	1.1	1.0	0.7
Barbados	4,463	16,015	0.8	0.0	-0.3
Belize	2,803	8,014	2.1	4.0	0.7
Costa Rica	67,604	14,344	4.5	5.1	3.5
Cuba	71,017	6,301	2.8	3.0	2.7
Dominica	734	10,372	0.2	-1.1	0.8
Dominican Republic	126,782	12,173	2.9	2.7	4.6
El Salvador	49,227	7,783	2.2	1.9	1.7
Grenada	1,214	11,481	0.8	-1.8	1.5
Guatemala	112,863	7,290	4.2	3.0	3.7
Haiti	17,571	1,703	5.5	2.9	4.3
Honduras	37,189	4,592	3.8	3.9	2.6
Jamaica	23,627	8,487	1.4	-0.5	0.2
Nicaragua	28,229	4,593	5.7	5.0	4.6
Panama	70,994	19,080	10.9	10.8	8.4
Saint Kitts and Nevis	1,159	19,823	-1.9	-0.9	3.8
Saint Lucia	1,882	11,150	1.3	-1.3	-2.3
Saint Vincent and the Grenadines	1,159	10,560	0.3	1.5	2.3
Trinidad and Tobago	40,588	30,197	-2.6	1.2	1.6
Other[5]	NA	NA	NA	NA	NA
Total	669,805	7,657 [3]	3.8 [4]	3.1 [4]	3.4 [4]
South America:					
Argentina	927,875	22,363	8.6	0.9	2.9
Bolivia	65,424	5,928	5.2	5.2	6.8
Brazil	3,012,880	14,987	2.7	1.0	2.5
Chile	395,617	22,534	5.8	5.5	4.2
Colombia	601,997	12,776	6.6	4.0	4.7
Ecuador	172,071	10,908	7.8	5.1	4.5
French Guiana	NA	NA	NA	NA	NA
Guyana	5,234	6,573	5.4	4.8	5.2
Paraguay	54,723	8,064	4.3	-1.2	13.6
Peru	357,642	11,557	6.5	6.0	5.8
Suriname	8,801	16,080	5.3	4.8	4.1
Uruguay	66,758	19,679	7.3	3.7	4.4
Venezuela	553,311	18,453	4.2	5.6	1.3
Total	6,222,333	15,300 [3]	4.6 [4]	2.5 [4]	3.4 [4]
Americas total	27,237,498	28,144 [3]	3.4 [4]	3.4 [4]	2.9 [4]
World total	101,933,870	14,307 [3]	4.1	3.4	3.3

NA Not available.

[1] Source: International Monetary Fund, World Economic Outlook Database, October 2014.

[2] Gross domestic product listed may differ from that reported in individual country chapters owing to differences in source or date of reporting.

[3] Gross domestic product/population.

[4] Weighted average.

[5] Includes Anguilla, Aruba, Bermuda, Bonaire, British Virgin Islands, Cayman Islands, Curacao, Guadeloupe, Martinique, Montserrat, Puerto Rico, Saba, Sint Eustatius, Sint Maarten, Turks and Caicos Islands, and U.S. Virgin Islands. Netherlands Antilles was dissolved in October 2010. Curacao and Sint Maarten became autonomous territories of the Netherlands.

TABLE 3
SELECTED SIGNIFICANT LATIN AMERICA AND CANADA EXPLORATION IN 2013[1]

Location	Type[2]	Site	Commodity	Company	Resource[3]
Argentina	E	Altar	Cu, Au, Ag	Stillwater Mining Co.	6.8 Mt Cu, 4.8 Moz Au, 61 Moz Ag (D).
Do.	E	Cerro Moro	Au, Ag	Yamana Gold Inc.	715,000 oz Au, 41 Moz Ag (R).
Brazil	E	Volta Grande	Au	Belo Sun Mining Corp.	2.8 Moz Au (R).
Canada	E	144	Au	Lake Shore Gold Corp.	Data not released.
Do.	E	Albany	Graphite	Zenyatta Ventures Ltd.	977,000 t graphite (ID).
Do.	E	Back River	Au	Sabina Gold & Silver Corp.	2.7 Moz Au (R).
Do.	F	Blackwater-Davidson	Au, Ag	New Gold Inc.	8.2 Moz Au, 61 Moz Ag (R).
Do.	E	Borden Lake	Au	Probe Mines Ltd.	3.7 Moz Au (D).
Do.	F	Brucejack	Au, Ag	Pretium Resources Inc.	7.3 Moz Au, 35 Moz Ag (R).
Do.	E	Coffee	Au	Kaminak Gold Corp.	719,000 oz Au (ID).
Do.	D	Gahcho Kue	Diamond	DeBeers SA	48 Mcarat diamond (R).
Do.	F	Kerr-Sulphurets-Mitchell (KSM)	Au, Cu, Ag, Mo	Seabridge Gold Inc.	38 Moz Au, 4.5 Mt Cu, 191 Moz Ag, 108,000 t Mo (R).
Do.	E	Mann Lake	U_3O_8	Cameco Corp.	Data not released.
Do.	F	Meliadine	Au	Agnico-Eagle Mines Ltd.	2.8 Moz Au (R).
Do.	P	New Afton	Au, Cu, Ag	New Gold Inc.	879,000 oz Au, 410,000 t Cu, 3.5 Moz Ag (R).
Do.	E	Patterson Lake South	U_3O_8	Fission Uranium Corp.	Data not released.
Do.	E	Premier	Au, Ag	Ascot Resources Ltd.	2.2 Moz Au, 15 moz Ag (ID).
Do.	P	Rice Lake	Au	San Gold Corp.	251,000 oz Au (R).
Chile	E	Maricunga	Au	Atacama Pacific Gold Corp.	3.5 Moz Au (D).
Do.	E	Productora	Cu, Au, Mo	Hot Chili Ltd.	420,000 t Cu, 226,000 oz Au, 10,000 t Mo (D).
Do.	E	Los Helados	Cu, Au, Ag	NGEx Resources Inc.	6.9 Mt Cu, 8.9 Moz Au, 80 Moz Ag (ID).
Colombia	E	Santa Rosa	Au	Red Eagle Mining Corp.	446,000 oz Au (D).
Do.	P	Segovia	Au	Gran Colombia Gold Corp.	460,000 oz Au (D).
Do.	E	Vetas	Au, Ag	Galway Gold Inc.	225,000 oz Au, 317,000 oz Ag (D).
French Guiana	E	Paul Isnard (Montagne d'Or)	Au	Columbus Gold Corp.	5.4 Moz Au (IF).
Mexico	P	Bolanitos	Ag, Au	Endeavor Silver Corp.	2.3 Moz Ag, 37,000 oz Au (R).
Do.	P	El Chanate	Au	AuRico Gold Inc.	1 Moz Au (R).
Do.	P	El Cubo	Ag, Au	Endeavor Silver Corp.	5.9 Moz Ag, 96,000 oz Au (R).
Do.	D	Morelos (Media Luna)	Au, Ag	Torex Gold Resources Inc.	4.1 Moz Au, 6.8 Moz Ag (R).
Do.	P	Mulatos	Au	Alamos Gold Inc.	2 Moz Au (R).
Do.	E	Promontorio	Ag, Au, Zn, Pb	Kootenay Silver Inc.	40 Moz Ag, 508,000 oz Au, 210,000 t Zn, 179,000 t Pb (D).
Do.	P	San Dimas	Au, Ag	Primero Mining Corp.	870,000 oz Au, 49 Moz Ag (R).
Do.	P	San Francisco	Au	Timmins Gold Corp.	1.6 Moz Au (R).
Do.	P	Santa Elena	Au, Ag	SilverCrest Mines Inc.	327,000 oz Au, 20 Moz Ag (R).
Nicaragua	E	La India	Au, Ag	Condor Gold Corp.	1.1 Moz Au, 1.8 Moz Ag (D).

[1] Abbreviations used in this table for commodities are as follows: Ag, silver; Au, gold; Cu, copper; Fe, iron ore; Mo, molybdenum; Pb, lead; U_3O_8, uranium oxide; Zn, zinc.

Abbreviations used in this table for units of measurement are as follows: Mcarat, million carats; Moz, million troy ounces; Mt, million metric tons; oz, troy ounces; t, metric tons.

[2] D, Approved for development; E, Active exploration; F, Feasibility work ongoing/completed; P, Exploration at producing site.

[3] Quantity expressed as contained metal or element in ore based on 2013 data reported from various sources; D, measured + indicated; ID, indicated; IF, inferred, R, proven + probable.

Data not verified by U.S. Geological Survey.

TABLE 4
LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2013[1]

(Thousand metric tons unless otherwise specified)

	Metals									
	Aluminum		Copper, mine output, Cu content	Gold, Au content (kilograms)	Iron and steel		Lead, mine output, Pb content	Nickel, mine output, Ni content	Silver, mine output, Ag content (metric tons)	Tin, mine output, Sn content (metric tons)
Country	Bauxite	Metal, primary			Iron ore, gross weight	Steel, crude				
Argentina	--	440	110	50,650	NA	5,188	26 [e]	--	844	--
Bolivia	--	--	8	6,751	--	--	82	--	1,287	19,287
Brazil	32,867	1,304	271	79,573	386,270	34,163	19	105	--	16,830
Chile	--	--	5,851	51,309	17,000 [e]	1,200 [e]	1	--	1,174	--
Colombia	--	--	1	55,745	710	1,297	--	70 [e]	14	--
Costa Rica	--	--	--	300	--	--	--	--	--	--
Cuba	--	--	--	--	--	280 [e]	--	66 [e]	--	--
Dominican Republic	--	--	10	26,083	--	--	--	1,100 [e]	78	--
Ecuador[e]	--	--	--	2,800	--	562	--	--	1	--
El Salvador	--	--	--	--	--	100 [e]	--	--	--	--
French Guiana	--	--	--	1,600 [e]	--	--	--	--	--	--
Guatemala	--	--	--	6,384	950 [e]	320	2 [e]	--	283	--
Guyana	1,649	--	--	14,692	--	--	--	--	--	--
Honduras	--	--	--	1,985	--	--	12	--	51	--
Jamaica	9,510	--	--	--	--	--	--	--	--	--
Mexico	--	--	409	117,848	18,840	18,028	253	--	5,821	--
Nicaragua	--	--	--	8,610	--	--	--	--	14	--
Panama	--	--	--	2,099	--	--	--	--	--	--
Paraguay	--	--	--	--	--	45	--	--	--	--
Peru	--	--	1,286	151,486	10,126	1,069	266	--	3,407	23,688
Suriname	2,706	--	--	34,213 [p]	--	--	--	--	--	--
Trinidad and Tobago	--	--	--	--	--	616	--	--	--	--
Uruguay	--	--	--	2,022	--	90	--	--	--	--
Venezuela	2,160	152 [e]	--	1,691	10,583 [2]	2,250 [2]	--	6 [e]	--	--
Other[3]	--	--	--	--	--	--	--	--	--	--
Total	48,900	1,900	7,950	616,000	444,000	65,200	662	1,350	13,000	59,800
Share of world total	17.3%	4.0%	43.8%	21.5%	14.0%	4.1%	12.2%	35.3%	27.1%	20.9%
Canada[p]	--	2,969	632	125,853	41,841	12,415	20	223	646	--
Share of world total	--	6.24%	3.49%	4.40%	1.32%	0.77%	(4)	5.86%	1.35%	--
United States	NA	1,950	1,250	230,000	53,000	86,900	340	--	1,040	--
Share of world total	NA	4.09%	6.89%	8.03%	1.67%	5.40%	6.27%	--	2.17%	--
Total Western Hemisphere	48,900	6,810	9,830	971,000	539,000	164,000	1,020	1,570	14,700	59,800
Share of world total	17.3%	14.3%	54.2%	34.0%	17.0%	10.2%	18.8%	41.2%	30.7%	20.9%
World total	283,000	47,600	18,100	2,860,000	3,180,000	1,610,000	5,420	3,810	47,800	287,000

See footnotes at end of table.

TABLE 4—Continued
LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2013[1]

(Thousand metric tons unless otherwise specified)

	Metals—Continued	Industrial minerals				Mineral fuels and related materials				
							Natural gas		Petroleum	
Country	Zinc, mine output, Zn content (metric tons)	Cement, hydraulic	Gypsum	Phosphate rock, P_2O_5 content	Salt	Coal, all grades	Dry (million cubic meters)	Plant liquids (thousand 42-gallon barrels)	Crude, including condensate (thousand 42-gallon barrels)	Refinery products (thousand 42-gallon barrels)
Argentina	40,000 [e]	11,892	1,400 [e]	--	1,500 [e]	250	41,708	10,000 [e]	203,639	283,650
Bolivia	407,331	2,500 [e]	1 [e]	--	2 [e]	--	17,810	4,000	15,177	13,889
Brazil[p]	152,147	69,975	3,333	2,504	7,275	7,407	28,174	32,938	738,715	471,636
Chile	29,759	4,800 [e]	1,015	4 [e]	6,577	2,902	893	--	2,525	67,500
Colombia	--	11,252	NA	NA	432	103,885	12,600	--	365,800	81,800 [e]
Costa Rica	--	1,500 [e]	--	--	--	--	--	--	--	19,016
Cuba	--	1,659	87	--	222	--	1,066	--	19,300 [e]	88,600 [e]
Dominican Republic	--	4,250 [e]	65	--	--	--	--	--	--	NA
Ecuador[e]	--	6,600	--	--	--	--	515	300	192,000	69,678 [5]
El Salvador	--	1,400 [e]	--	--	--	--	--	--	--	--
French Guiana	--	92 [e]	--	--	--	--	--	--	--	--
Guatemala	1,221	3,000 [e]	118	--	60 [e]	(4)	(4)	--	3,645	223
Guyana	--	--	--	--	--	--	--	--	--	--
Honduras	25,000	1,700 [e]	--	--	--	--	--	--	--	--
Jamaica	--	825	48	--	--	--	--	--	--	8,000
Mexico	642,542	34,612	5,091	665	9,461	28,783	47,600 [e]	148,100	935,079	438,900
Nicaragua	--	700 [e]	37	--	--	--	--	--	--	--
Panama	--	2,000 [e]	--	--	15 [e]	--	--	--	--	--
Paraguay[e]	--	650	5	--	--	--	--	--	--	--
Peru	1,350,874	10,527	298	774	1,205	189	3,800 [e, 6]	38,187 [7]	22,956 [7]	55,898 [5]
Suriname	--	65 [e]	--	--	--	--	--	--	5,980	2,780
Trinidad and Tobago	--	802	--	--	--	--	42,244	12,573	29,617	48,177
Uruguay	--	900 [e]	--	--	--	--	--	--	--	15,731
Venezuela	--	7,800	--	NA	NA	1,083	21,820 [8]	42,300 [e]	1,058,100 [9, 10]	449,300 [9, 11, 12]
Other[3]	--	--	--	--	--	--	--	--	800 [e]	--
Total	2,650,000	180,000	11,500	3,950	26,800	145,000	218,000	288,000	3,590,000	2,110,000
Share of world total	19.68%	4.39%	4.51%	5.60%	9.92%	1.80%	6.44%	9.76%	12.59%	7.79%
Canada[p]	426,089	11,612	1,820	200 [e]	12,210	68,908	141,396	220,000 [e]	1,260,000 [e]	681,000 [e]
Share of world total	3.16%	(4)	0.71%	(4)	4.53%	0.86%	4.17%	7.45%	4.41%	2.51%
United States	784,000	77,400	15,500	8,930	40,300	1,090,000	688,000	951,000	2,720,000	4,430,000
Share of world total	5.8%	1.9%	NA	12.7%	6.0%	13.5%	20.3%	32.2%	9.5%	16.3%
Total Western Hemisphere	3,860,000	269,000	28,800	13,100	79,300	1,300,000	1,050,000	1,460,000	7,570,000	7,230,000
Share of world total	28.7%	6.6%	11.3%	18.5%	38.0%	16.2%	30.9%	49.4%	26.5%	26.6%
World total	13,500,000	4,090,000	255,000	70,500	270,000	8,030,000	3,390,000	2,950,000	28,600,000	27,100,000

See footnotes at end of table.

TABLE 4—Continued
LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2013[1]

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[e] Estimated; estimated data, U.S. data, and world totals are rounded to no more than three significant digits. [p] Preliminary. NA Not available. -- Zero or zero percent.

[1] Totals may not add due to independent rounding. Percentages are calculated on unrounded data. Table includes data available as of October 16, 2015.

[2] Includes Aruba, Barbados, Belize, Curacao, Guadeloupe, Haiti, Martinique, Saba, Saint Eustatius, and Sint Maarten.

[2] World Steel Association, crude steel production, 2009–13 and iron production, 2009–13.

[3] Includes Aruba, Barbados, Belize, Curacao, Guadeloupe, Haiti, Martinique, Saba, Saint Eustatius, and Sint Maarten.

[4] Less than ½ unit or less than ½ percent.

[5] Reported figure.

[6] Source: Ministerio de Energía y Minas del Perú, Anuario Estadistico de Hidrocarburos, 2013.

[7] Source: Banco Central de Reserva del Perú, Memoria, 2013.

[8] Source: Organization of the Petroleum Exporting Countries, Annual Statistical Bulletin 2014.

[9] Excludes production under contract with the Government.

[10] Source: Petróleos de Venezuela S.A., Informe de Gestion Annual 2013.

[11] Includes asphalt, distillates, gasoline, jet fuel, kerosene, naphtha, parrafins, petroleum coke, and residuals.

[12] Excludes byproduct sulfur.

TABLE 5
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED BAUXITE MINE PRODUCTION, 2005–2020[1]

(Thousand metric tons)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Brazil	22,034	29,000	33,260	32,867	33,000	35,000	36,000
Dominican Republic	535	9	--	--	--	--	--
Guyana	1,694	1,083	2,210	1,649	2,200	2,300	2,400
Jamaica	14,116	8,540	9,290	9,510	10,000	10,000	10,000
Suriname	4,757	3,104	3,400	2706	3,400	3,500	3,500
Venezuela	5,900	3,126	2,286	2,160	2,200	2,200	2,200
Total	49,000	44,900	50,400	48,900	50,800	53,000	54,100

[e] Estimated. -- Negligible or no production.

[1] Estimated data and totals are their rounded to no more than three significant digits; may not add to totals shown.

TABLE 6
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PRIMARY AND SECONDARY ALUMINUM METAL PRODUCTION, 2005–2020[1]

(Thousand metric tons)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Argentina	270	413	413	440	440	440	440
Brazil	1,749	1,788	1,666	1,512	1,600	1,600	1,600
Canada	3,070 [2]	3,000	2,820	3,010	3,700	3,700	3700
Venezuela	615	335	203	152	300	300	300
Total	5,700	5,540	5,100	3,600	6,000	6,000	6,000

[e] Estimated.

[1] Estimated data and their totals are rounded to no more than three significant digits; may not add to totals shown.

[2] Includes secondry aluminum production.

TABLE 7
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED COBALT MINE PRODUCTION, 2005–2020[1]

(Metric tons)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Brazil	1,500	3,139	2,900	3,500	3,500	3,500	3,500
Canada	5,767	4,568	6,625	6,916	7,100	7,200	7200
Cuba	5,277	4,800	4,900	4,200	4,200	4,400	4,400
Total	12,500	12,500	14,400	14,600	14,800	15,100	15,100

[e] Estimated.

[1] Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 8
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED COPPER MINE PRODUCTION, 2005–2020[1]

(Thousand metric tons)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Argentina	187	140	136	110	100	200	200
Bolivia	(2)	2	9	8	10	10	10
Brazil	133	214	223	271	300	300	300
Canada	595	522	579	632	700	700	700
Chile	5,321	5,419	5,434	5,851	6,000	6,500	6,000
Colombia	2	4	1	1	2	4	4
Dominican Republic	--	10	12	10	10	12	12
Ecuador	--	--	--	--	--	30	60
Mexico	429	238	440	409	500	500	500
Peru	1,010	1,094	1,198	1,286	1,500	1,600	1,700
Total	7,680	7,640	8,030	8,600	9,100	9,900	9,500

[e] Estimated. -- Negligible or no production.

[1] Estimated data and their totals are rounded to no more than three significant digits; may not add to totals shown.

[2] Less than 1/2 unit.

TABLE 9
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED REFINED COPPER METAL PRODUCTION, 2005–2020[1]

(Thousand metric tons)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Argentina[2]	16	16	15	14	14	14	14
Bolivia	--	1	2	1	2	2	2
Brazil	224	253	215	266	270	270	270
Canada	515	320	276	322	300	300	300
Chile[3]	2,824	3,244	2,902	2,755	2,700	2,600	2,500
Mexico	416	278	370	409	400	400	400
Peru[3]	512	394	311	361	360	400	400
Total	4,510	4,510	4,090	4,100	4,000	4,000	3,900

[e]Estimated. -- Negligible or no production.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

[2]Secondary production only.

[3]Primary production only.

TABLE 10
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED GOLD MINE PRODUCTION, 2005–2020[1]

(Metric tons)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Argentina	27,904	63,138	59,700	50,650	58,000	58,000	58,000
Belize	(2)	--	--	--	--	--	--
Bolivia	8,801	6,394	6,973	6,751	40,000	40,000	40,000
Brazil	38,293	62,047	66,773	79,573	80,000	80,000	80,000
Canada	120,541	102,693	105,270	125,853	150,000	160,000	175,000
Chile	40,447	39,494	49,936	51,309	60,000	70,000	80,000
Colombia	35,783	53,600	66,178	55,745	39,000	40,000	40,000
Costa Rica	424	--	400	300	--	--	--
Cuba	--	--	--	--	--	--	--
Dominican Republic	--	500	4,106	26,083	34,000	34,000	34,000
Ecuador	5,338	4,600	4,000	2,800	5,000	7,000	8,000
French Guiana	1,955	1,140	1,300	1,600	1,400	1,500	1,600
Guatemala	741	9,213	6,473	6,384	7,000	7,000	7,000
Guyana	8,325	9,594	13,643	14,964	14,000	14,000	14,000
Honduras	4,438	2,197	1,858	1,985	2,000	2,000	2,000
Mexico	30,356	72,600	102,802	117,848	119,000	125,000	125,000
Nicaragua	3,674	4,900	6,981	8,610	5,000	5,000	5,000
Panama	--	870	2,115	2,099	2,000	5,000	8,000
Peru	208,002	164,084	161,544	151,486	150,000	160,000	170,000
Suriname	10,619	31,084	33,474	34,213	35,000	35,000	35,000
Uruguay	3,151	1,740	1,725	2,022	2,000	2,000	2,000
Venezuela	10,480	6,991	1,981	1,691	1,700	1,700	1,700
Total	559,000	637,000	697,000	742,000	800,000	800,000	900,000

[e]Estimated. -- Negligible or no production.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

[2]Less than 1/2 unit.

TABLE 11

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED BENEFICIATED IRON ORE PRODUCTION, 2005–2020[1]

(Thousand metric tons)

Country	Iron content	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Argentina	68%	--	--	--	--	--	--	--
Bolivia	65%	--	(2)	(2)	--	10	10	10
Brazil	64%	186,891	247,772	258,129	245,668	246,000	290,000	290,000
Canada[3]	64%	19,333	23,300	25,000	26,000	38,000	48,000	57,000
Chile	61%	4,707	5,852	9,429	9,000	13,000	16,000	18,000
Colombia	60%	325	77	173	200	200	200	200
Cuba	45%	9	--	--	--	--	--	--
Guatemala	65%	7	(2)	1	1	1	1	1
Mexico	60%	7,012	7,931	8,047	8,094	8,500	9,000	9,200
Peru	68%	4,565	6,140	6,792	6,788	7,000	7,000	7,000
Uruguay	50%	12	16	16	16	16	16	16
Venezuela	62%	13,000	8,700	9,400	6,600	12,000	12,000	12,000
Total	XX	236,000	300,000	317,000	302,000	300,000	300,000	400,000

[e] Estimated. XX Not applicable. -- Negligible or no production.

[1] Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

[2] Less than 1/2 unit.

[3] Includes beneficiated and direct-shipped ore.

TABLE 12

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED CRUDE STEEL PRODUCTION, 2005–2020[1]

(Thousand metric tons)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Argentina	5,386	5,138	4,996	5,188	5,000	5,000	5000
Brazil	31,631	32,928	34,524	34,163	34,200	35,000	35,000
Canada	15,327	13,003	13,507	12,415	16,000	16,000	16,000
Chile	1,537	1,011	1,683	1,200	1,650	1,650	1,650
Colombia	1,007	1,213	1,324	1,297	1,300	1,400	1,400
Cuba	245	278	277	280	300	300	300
Dominican Republic	242	193	300	--	NA	NA	NA
Ecuador	389	372	536	562	500	500	500
El Salvador	48	64	102	100	120	120	120
Guatemala	207	274	334	320	350	370	400
Jamaica	--	--	--	--	--	--	--
Mexico	16,202	16,710	18,095	18,028	18,500	19,000	19,500
Paraguay	101	59	44	45	50	60	70
Peru	750	880	981	1,069	1,100	1,100	1,100
Trinidad and Tobago	711	572	624	616	620	650	650
Uruguay	64	65	78	90	100	100	100
Venezuela	4,907	2,207	2,359	2,250	2,300	2,300	2,300
Total	78,800	75,000	79,800	77,900	80,000	80,000	80,000

[e] Estimated. NA Not available. -- Negligible or no production.

[1] Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 13

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED NICKEL MINE PRODUCTION, 2005–2020[1]

(Thousand metric tons)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Brazil	74	109	139	105	100	100	100
Canada	200	160	211	223	225	225	225
Colombia	90	70	50	70	50	50	50
Cuba	74	69	68	66	66	70	75
Dominican Republic	53	--	1,143	1,100	--	--	--
Venezuela	20	11	10	6	6	6	6
Total	5,280,000	11,400,000	15,100,000	1,570	400	500	500

[e] Estimated. -- Negligible or no production.

[1] Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 14

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PALLADIUM MINE PRODUCTION, 2005–2020

(Kilograms)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Canada	10,400	6,200	13,100	16,000	19,000	19,000	19,000

[e] Estimated; estimated data are rounded to no more than three significant digits.

TABLE 15

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PLATINUM MINE PRODUCTION, 2005–2020[1]

(Kilograms)

Country	2005	2,010	2012	2013	2016[e]	2018[e]	2020[e]
Canada	6,075	3,500	7,500	6,800	10,000	10,000	10,000
Colombia	1,082	997	1,460	1,836	1,600	1,600	1,600
Total	7,160	4,500	8,960	8,600	10,000	10,000	10,000

[e] Estimated.

[1] Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 16

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED TIN MINE PRODUCTION, 2005–2020[1]

(Sn content in metric tons)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Argentina	1	--	--	--	--	--	--
Bolivia	18,433	20,190	19,702	19,287	19,000	22,000	22,000
Brazil	11,739	10,400	13,667	16,830	17,600	18,000	18,000
Peru	42,145	33,848	26,105	23,688	23,000	23,000	23,000
Total	72,300	64,400	59,500	59,805	59,600	63,000	63,000

[e] Estimated. -- Negligible or no production.

[1] Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 17
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED TIN METAL PRODUCTION, 2005–2020[1]

(Metric tons)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Bolivia	13,941	15,003	14,517	14,862	15,000	22,000	22,000
Brazil	9,236	9,098	11,955	14,721	15,400	15,700	15,700
Mexico	17	--	--	--	--	--	--
Peru	36,733	36,451	24,811	24,181	24,000	24,000	24,000
Total	59,900	60,600	51,300	53,800	50,000	60,000	60,000

[e] Estimated. -- Negligible or no production.

[1] Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 18
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED DIAMOND PRODUCTION, 2005–2020[1]

(Thousand carats)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Brazil	208	25	49	49	50	160	220
Canada	12,314	11,773	10,451	10,560	11,000	10,000	10,000
Guyana	357	50	41	56	50	50	55
Venezuela	115	15	15	15	15	15	15
Total	13,000	11,900	10,600	10,700	10,000	10,000	10,000

[e] Estimated.

[1] Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 19
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED LITHIUM PRODUCTION, 2005–2020[1]

(Li content in metric tons)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Argentina	2,800	3,213	2,529	3,000	5,000	7,000	12,000
Bolivia	--	--	--	--	--	5	8
Brazil	210	489	390	416	425	450	475
Canada	670	--	--	--	3,800	3,800	3,800
Chile	8,290	9,722	13,226	11,500	12,500	13,000	13,000
Total	12,000	13,400	16,100	14,900	20,000	20,000	30,000

[e] Estimated. -- Negligible or no production.

[1] Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 20
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED SALABLE COAL PRODUCTION, 2005–2020[1]

(Thousand metric tons)

Country	2005	2010	2012	2013	2016[e]	2018[e]	2020[e]
Argentina	320	140	160	250	140	120	100
Brazil	6,480	5,743	6,635	7,407	7,500	7,600	7,700
Canada[2]	67,555	67,876	66,563	68,908	70,000	80,000	90,000
Chile	732	619	712	2,902	700	700	700
Colombia	59,064	74,350	89,024	103,885	99,700	108,000	130,000
Mexico[2]	11,750	27,565	29,932	28,783	29,000	29,000	29,000
Peru[2]	22	121	226	189	250	275	300
Venezuela	7,195	2,630	1,911	1,083	1,100	1,200	1,200
Total	153,000	179,000	195,000	213,000	200,000	200,000	300,000

[e] Estimated.

[1] Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

[2] Run of mine.

THE MINERAL INDUSTRY OF ARGENTINA

By Susan Wacaster

In 2013, Argentina produced and traded such metals as cadmium, copper, gold, lead, molybdenum, silver, and zinc; such energy minerals as natural gas, crude petroleum, and uranium; and a wide variety of industrial minerals, including lithium. Copper, gold, silver, and zinc, which are associated primarily with epithermal deposits, remained the most valuable mineral commodities produced in Argentina. The country's mineral endowment was relatively unexploited, and the deteriorating economy contributed to decreases in mining investment and exploratory drilling. In 2013, Argentina's exploration budget decreased to $292 million, or by 43% compared with that of 2012, which was the lowest level since 2009; the country's exploration budget accounted for 2% of the world's exploration budget (SNL Metals Economics Group, 2013, p. 40).

Argentina's total (cumulative) external debt as a percentage of its gross domestic product (GDP) averaged 40.7% in the 1990s, 74.5% in the 2000s (when it ranged between a high average of 153.6% in 2002—a time of great financial crisis—and a low average of 37.7% in 2009), and 4.9%, 31.4%, and 29.6% in 2010, 2011, and 2012, respectively. During the past 3 years, the country's foreign exchange reserves, which had been generated primarily by exports of grains, had been depleted; in 2013, they decreased by 20% to $34.4 billion (the lowest level since 2007). By October 2013, Argentina was dealing with another currency devaluation and the possibility of sovereign debt default related to the country's recession of 1999–2002 and the resultant economic crisis of late 2001 and 2002. In 2005 and 2010, debt restructuring allowed Argentina to repay all its obligations to the International Monetary Fund, and public debt had decreased again to 45% of the GDP. At yearend 2013, a small group of the bondholders that had invested in Argentina's distressed securities in the early 2000s (about one-half of which were issued post-crisis through private equity funds that purchased the debt at a discount to profit from repayment) refused the terms of the debt swap and brought a legal suit against the Government of Argentina in U.S. courts (Blackman and Mukhi, 2010; Levine, 2013; Nahón, 2013; Comisión Económica para América Latina y el Caribe, 2014).

Minerals in the National Economy

The value of production of goods (including those from the agriculture, forestry, and livestock; construction; electricity, gas, and water; fishing; manufacturing; and mining and quarrying sectors) accounted for 34.1% of Argentina's nominal GDP in 2013 compared with a revised 34.4% in 2012. The value of the mining and quarrying sector accounted for 2.8% of Argentina's total GDP compared with 3.0% in 2012, and the value of the production of goods accounted for 8.6% of the total GDP compared with 3.0% in 2012 (Instituto Nacional de Estadística y Censos, 2014b).

Historically, the mineral industry in Argentina began to receive significant investment as a result of legislation passed in the early 1990s, and the value contributed to the GDP from mining and quarrying had increased annually since at least 1993, except for in the recession years of 1997 and 1998, in 2001, and in 2007 (a modest decrease). Despite the economic crisis in 2001 and 2002, the value of the mineral industry decreased by only 6% in 2001 compared with that of 2000 as inward foreign direct investment (FDI) to the sector continued to increase. In 2002, the value of the mineral industry increased by 181% compared with that of 2001. That increase was owing in part to decreased operational costs as a result of the country's currency crisis. A subsequent mineral commodity price boom in the mid-2000s further supported economic stability in the mineral industry. In 2008 and 2009, when much of the world was experiencing fallout from a global financial downturn, the value of Argentina's mineral industry as a percentage of the GDP again remained constant or increased, and it continued to do so through 2012 (Comisión Económica para América Latina y el Caribe, 2014; Instituto Nacional de Estadística y Censos, 2014b).

In 2013, private analysts estimated that inflation had increased to at least 25% per year for several consecutive years (as opposed to the Argentine Government's reported rate of between 10% and 11%) as the Central Bank had maintained low interest rates and increased the monetary supply. The Government set limits on repatriations of profits out of Argentina. Mining companies had to exchange U.S. dollars earned from exports into pesos on Argentina's regulated currency market at a rate that was 40% less than the unofficial rate, yet many of the services that those same companies used were priced at the unofficial rate (Levine, 2013).

Government Policies and Programs

Argentina's Dirección Nacional Minería [National Mining Directorate (DNM)] oversees the administration, development, and promotion of mining and mining investment. The DNM is one of the departments administered by the Ministerio de Planificacion Federal, Inversion Publica y Servicios [Ministry of Federal Planning, Public Investment and Services]. The Dirección Nacional de Planificación Estrategica Regional [National Directorate of Regional Strategic Planning] and the Servicio Geológico Minero Argentino [Geological and Mining Service of Argentina] (SEGEMAR) were under the authority of the Mining Secretariat of the DNM. The Camara Argentina de Empresarios Mineros [Argentine Chamber of Mining Companies] (CAEM) is a civil association that advocates for development of the mineral industry. El Grupo de Empresas Mineras Exploradoras de la República Argentina (GEMERA), whose members are exploration companies of different sizes and origins, is a business association that is part of the CAEM. GEMERA partners with Provincial mining chambers to address local and national mining issues (Grupo de Empresas Mineras Exploradoras de la República Argentina, [2012]; Ministerio de Planificación Federal, Inversión Pública y Servicios, 2014).

Argentina's Codigo de Mineria [Mining Code] was enacted by the Argentine Congress on November 25, 1886. The Mining Code underwent significant revisions in 1993 with the enactment of law No. 22,224 (Mining Reorganization Law) and law No. 24,228 (Federal Mining Covenant); in 1995 with the enactment of law No. 24,498 (Mining Modernization Law), law No. 24,523 (creation of the National Mining Trade System of the Mining Secretariat), and law No. 24,585 (Environmental Protection Mining Law); and in 1997 with the passage of law No. 25,225 (Secretaría de Minería de la Nación, 2014).

Argentina's law No. 24,196 (the Mining Investment Law of 1993) provided incentives for companies to invest in mineral exploration, including a 30-year guarantee of fiscal stability for new projects, an exemption from import duties on capital goods, and an upper ceiling on Provincial mining taxes. This law also established an attractive environment for investment in mining activities by promoting and establishing guidelines for prospecting, exploration, construction, and commissioning of mining projects, as well as the expansion and modernization of existing productive assets at a time when mining was less important to the country's economy (Secretaría de Minería de la Nación, 2014).

In 2011, in an attempt to control inflation and the outflow of the Central Bank's foreign currency reserves, the Government issued Decree No. 1,722/2011, which requires that export revenues generated by the mining and energy sectors remain in or be repatriated to Argentina to be exchanged on the local currency market. This Decree appears to be a contradiction of Decree No. 753 of 2004 that authorized mining and oil and gas companies to take their export revenues out of the country but is similar to Decree No. 2,581 of 1964 that required energy companies to keep all export revenues in local markets (Buenos Aires Herald, 2011; Latin American Tax Newsalert, 2011).

Law No. 25,551 of 2011 establishes a domestic preference for local industry for most Government procurement if a domestic supplier's bid is only 5% to 7% higher than the foreign bid. In March 2011, the Argentine Senate approved an amendment to the law that would extend the "Buy Argentine" plan to include licensees and concessionaires of public utilities and other services, including mining and oil and gas companies. The amendment would also increase the price preference for local suppliers to 10%. The draft law was still pending in committees of the Argentine Lower House at yearend 2012 (Office of the United States Trade Representative, 2014, p. 6).

As the Government sought to replace imported freight transportation services, machinery, mining equipment, parts, and other services, an agency called the Mesa de Homologación Minera (MHM) [Mining Certification Board] was created to generate business opportunities for local mining suppliers. The MHM was tasked with promoting the replacement, when possible, of foreign suppliers with those of domestic origin by assessing and resolving issues of domestic supply and demand. In May 2012, two resolutions were issued—Resolution 12/2012 and Resolution 13/2012—that require mining companies registered in Argentina to use Argentine vessels to transport mineral commodity exports from Argentina and to purchase domestic capital goods, spare parts, and services in accordance with the Government's import substitution policies. To increase development of domestic value-added production, export taxes are imposed on all but a few exports. In some cases, the export tax for raw materials is higher than the sale price of the processed product. Exports of hydrocarbons are indexed to world commodity benchmarks. In August 2012, pursuant to Decree No. 1513/2012, the Government extended the ban on ferrous scrap exports first imposed in 2009 for an additional 360 days (Instituto Argentino de Normalización y Certificación, 2014; Office of the United States Trade Representative, 2014, p. 2–5).

Earnings on exports of goods and services (including mineral commodity exports) must be converted to Argentine pesos on the local foreign exchange market in Argentina. Decree No. 1722/2011 eliminated the exceptions that had previously been granted to hydrocarbon and mining exporters, although revenues generated from exports of goods and services to Argentine foreign trade zones and from the reexport of some temporary imports were still exempt from the requirement in 2013. The time limits originally set for fulfilling the obligation to convert earnings into pesos ranged from 60 days to 360 days for goods and 15 days for services, and an unspecified portion of foreign currency earned through exports could be used for foreign transactions. In April 2012, however, the Government issued Resolution No. 142/12, which reduced the time limit for companies to convert their export earnings to pesos on the local foreign exchange market to within 15 days. This brought exports for some industries, including the mining industry, to a virtual halt. In response, the Government partially eased the requirement and revised the timeframes to between 15 and 360 days, depending on the exported product (Office of the United States Trade Representative, 2014, p. 5–8).

Argentina prohibits the import of many used capital goods, (although exceptions are in place for some industries, including mining), and restricts the import of any remanufactured goods, including earthmoving equipment. To restrict imports and protect the sectors deemed "sensitive," the Government limited the type of import licenses issued. Throughout 2012, about 600 tariff lines were subject to nonautomatic licenses, which resulted in complications for import partners. In January 2013, however, the nonautomatic import license requirements on iron, steel, and metal products and general and special purpose machinery were repealed (Office of the United States Trade Representative, 2014, p. 2–3).

Production

Production of primary aluminum in 2013 increased by 6.5% to a reported 440,176 metric tons (t), approaching the expanded installed capacity of 460,000 metric tons per year (t/yr) at Aluar Aluminio Argentino S.A.I.C.'s Puerto Madryn plant, which was the country's only primary aluminum producer. Gold mine output was estimated to have decreased by 7.3% in 2013 compared with that of 2012 to about 50,650 kilograms (kg) as increases in gold production at the Cerro Vanguardia, the San Jose, and the Manantial Espejo Mines were offset by decreases in production at the Capsoso, the Gualcamayo, and the

Veladero Mines. The total amount of iron contained in pig and sponge iron increased to about 3.9 million metric tons (Mt), or by 6% compared with that of 2012. Argentina exports virtually all of its lithium production, and in 2013, 8,999 t of lithium carbonate was exported from Argentina compared with 9,723 t in 2012. The Salar del Hombre Muerto, which was operated by Minera del Altiplano S.A. (a subsidiary of FMC Corp. of the United States), was the only major commercial lithium operation active in 2013 (Instituto Nacional de Estadistica y Censos, 2014c, p. 69; United Nations Statistics Division, 2014).

Structure of the Mineral Industry

The mineral industry in Argentina was composed of domestic and foreign private and public companies. In 2013, about 40% of the mining companies working in Argentina were headquartered in Canada. Several acquisitions were announced in 2013, including Las Opeñas gold project located in San Juan Province, the Cerro Samenta copper project located in Salta Province, and the San Jorge copper project located in Mendoza Province.

Teck Resources Ltd. of Canada announced that it would exercise its back-in rights for a 60% interest in Las Opeñas project from Genesis Minerals Ltd. of Australia by agreeing to spend $1.2 million at the project. Teck planned to continue exploration at Las Opeñas by targeting a large mineralized system. Genesis had discovered wide zones of gold mineralization with associated lead, silver, and zinc during its first drilling program at Las Opeñas in 2012. The company reported that Las Opeñas had the potential to host a multimillion-ounce gold deposit in a large epithermal system. Mineralization is hosted within polymictic breccias and fine-grained sediments. Galena, pyrite, and sphalerite occur as disseminated mineralization and within crosscutting veinlets (Genesis Minerals Ltd., 2013).

Marifil Mines, Ltd. of Canada signed a definitive agreement with Southern Copper Argentina (an indirect subsidiary of Grupo Mexico S.A.B. de C.V.) whereby Southern Copper would acquire a 70% equity interest in the Cerro Samenta Mine by paying a total of about $375,000 during a 4-year period, by spending at least $4 million on exploration at Cerro Samenta, and by making contract payments on behalf of Marifil to two other property owners during a 6-year period. Southern Copper would be able to increase its interest in Cerro Samenta to 80% by providing Marifil with a bankable feasibility study within 7 years. In 2013, Southern Copper reported that its environmental report required for drilling had been approved and that the company had been carrying out geologic mapping at a scale of 1:25,000 and had collected and analyzed 338 rock samples (Marifil Mines, Ltd., 2013a, b).

In December, Coro Mining Corp. of Canada signed an earn-in agreement by which Aterra Investments Ltd. of Russia and Solway Industries Ltd. of Cyprus would acquire a 70% interest in the San Jorge project by paying Coro $1.5 million within 24 months from the signing of the agreement and, among other terms, complete an independent bankable feasibility study. Aterra and Solway had the option to acquire 100% of the project by paying Coro $3 million in cash at any time within 6 months from the signing of the agreement or $5 million in cash at any time within 18 months from the signing of the agreement. San Jorge is a hydrothermally altered porphyry deposit. Ore minerals include chalcocite, chalcopyrite, covellite, digenite, and malachite. Total reserves and resources at San Jorge as of March 2012 were reported to be 194 Mt containing 922,000 t of copper and about 30,000 kg of gold (Coro Mining Corp., 2013, 2014).

Mineral Trade

Argentina was a member of the Mercado Común del Sur (MERCOSUR) [Southern Common Market], along with Brazil, Paraguay, Uruguay, and Venezuela; the partner countries included Bolivia, Chile, Colombia, Ecuador, and Peru. Argentina remained a net exporter in 2013 as it had been every year since 2000, but the total free on board (f.o.b.) value of exports decreased by 17.5% to about $81.7 billion from $96 billion in 2012. Of that value, 28.4% was received by other MERCOSUR member or partner countries. The f.o.b. value of Argentina's exports, by economic area, included $23.2 billion in receipts from MERCOSUR countries; $15.2 billion from the Association of Southeast Asian Nations (ASEAN) member countries plus China (including Hong Kong and Macau), Japan, India, and the Republic of Korea; $10.6 billion from the countries of the European Union (EU); $7.6 billion from the North American Free Trade Agreement (NAFTA) member countries (the United States, Canada, and Mexico); $3.9 billion from the Arab Maghreb Union and Egypt; and $21.2 billion from the rest. Brazil was the leading recipient of Argentine exports, followed by the United States and Chile (Instituto Nacional de Estadistica y Censos, 2014a, p. 3).

The value of Argentine imports in 2013, as reported in terms of cost, insurance, and freight (c.i.f.) arrangements, decreased by 7.7% compared with that of 2012. Of that value, 27.7% was imported from other MERCOSUR member or partner countries. The c.i.f. value of imports by economic area included $20.4 billion in receipts from MERCOSUR member or partner countries; $17.1 billion from ASEAN member countries plus China (including Hong Kong and Macau), Japan, India, and the Republic of Korea; $13.5 billion from the countries of the EU; $10.7 billion from the NAFTA member countries, $19.2 million from the Arab Maghreb Union and Egypt; and $11.6 billion from the rest. In terms of c.i.f. value, Brazil was the leading supplier of Argentine imports followed by China and the United States (Instituto Nacional de Estadistica y Censos, 2014a, p. 3).

A total of $5.2 billion worth of goods classified as mineral products was exported from Argentina in 2013. Of that value (the total of which accounted for 6.4% of exported goods), 70% was composed of mineral fuels, mineral oils and products of their distillation, bituminous substances, and mineral waxes. Argentina received $11.9 billion worth of imported mineral products (which accounted for 13.1% of imported goods), 91.3% of which was composed of mineral fuels, mineral oils and products of their distillation, bituminous substances, and mineral waxes. Common metals and manufactured articles thereof traded between Argentina and other countries included aluminum, copper, iron and steel, nickel, tin, and other base metals. The value of exports of those goods was $2.7 billion in 2013 (of which 46% was accounted for by copper and articles thereof, and 28%, by aluminum and articles thereof). The value of imported common metals and manufactures to Argentina was $3.6 billion (61% of which was composed of iron and steel and articles thereof) (Instituto Nacional de Estadistica y Censos, 2014a, p. 11, 13).

Commodity Review

Metals

Aluminum.—Aluar was Argentina's only primary aluminum producer. In 2013, the company produced 440,176 t of primary aluminum and 25,600 t of manufactured aluminum products during its production year, which ended on June 30. For the year, 77% of Aluar's production was exported. Exports consisted of pure ingot (56%), billets (24%), wire rods (12%), and primary foundry alloys (8%). The primary aluminum and aluminum semimanufactures were received by other Latin American countries (38%), the United States and Mexico (about 37% combined), Asia (21%), and the countries of the EU (3%) (Aluar Aluminio Argentino S.A.I.C., 2014; Instituto Nacional de Estadistíca y Censos, 2014b).

Copper and Molybdenum.—In 2013, 37.4 Mt of ore was mined at Minera Alumbrera Ltd.'s Alumbrera Mine from which a reported 109,588 t of copper was produced. Production of copper in concentrate at Alumbrera decreased by 19.3% in 2013 compared with that of 2012 as a result of continued lower mill head grade and a reduced recovery rate. Alumbrera started commercial operations in 1997, producing 30,000 t of copper in concentrate that year. In the 2001–02 timeframe, a mine expansion plan was completed and the operation achieved maximum copper production of 204,027 t. In 2006, a molybdenum flotation plant near the existing Alumbrera concentrator was approved, and commissioning was completed by yearend 2008. The estimated 2013 production in table 1 is based upon the average of production volume ratios for copper and molybdenum at the Alumbrera Mine. The operation had an open pit mine and the capacity to process 120,000 metric tons per day (t/d) of ore into concentrate and dore from a sulfide porphyry deposit containing chalcopyrite, gold, molybdenite, and pyrite (Edelstein, 2008; Goldcorp Inc., 2009, p. 17; 2014, p. 44).

In May, Glencore International plc and Xstrata plc merged to form Glencore Xstrata plc. The ownership structure of Minera Alumbrera Ltd., which operated the Agua Rica polymetallic porphyry project, thus became Glencore Xstrata (50% ownership), Goldcorp Inc. (37.5%), and Yamana Gold Inc. (12.5%). The Agua Rica deposit, which is located in Catamarca Province about 35 kilometers (km) from the Alumbrera Mine, is a porphyry deposit containing copper, molybdenum, and a lesser amount of gold, and it has a polymetallic epithermal overprint. The deposit's copper resources are held mostly in covellite or chalcocite. Agua Rica remained a feasibility-stage project in 2013. As of yearend 2013, total reserves and resources at Agua Rica included 1.75 billion metric tons (Gt) containing 7.4 Mt of copper, about 308,000 kg of gold, 581,051 t of molybdenum, and 5,200 t of silver (Yamana Gold Inc., 2014).

In 2013, Glencore Xstrata continued work on the advanced feasibility study at the El Pachon project in San Juan Province, which had been wholly owned by Xstrata prior to its merger with Glencore. As of yearend 2013, mineral reserves and resources at El Pachon totaled about 3.3 Gt containing 15.5 Mt of copper, 354,400 t of molybdenum, and about 6,800 t of silver (Glencore Xstrata plc, 2013, p. 16).

Gold.—In 2013, production from Argentina included 8,102 kg of gold from Anglo Gold Ashanti Ltd. of South Africa's (92.5%) Cerro Vanguardia Mine in Santa Cruz Province compared with 7,361 kg in 2012. The Cerro Vanguardia Mine commenced production in 1998. The highest reported mill head grade from Cerro Vanguardia was 15.1 grams per metric ton (g/t) in 1999, but the grade had remained between 5.5 g/t and 7.7 g/t since that time. The average mill head grade of the ore recovered in 2013 was 6.6 g/t gold compared with 6.5 g/t in 2012. The operation had an installed processing capacity of 3,000 t/d and produced dore from open pit and underground operations. Cerro Vanguardia is an epithermal deposit located in the central portion of the Deseado Massif. The ore body consists of low-sulfidation quartz veins cutting ignimbrites and volcaniclastic rocks. Veins consist mainly of andularia, quartz, and minor amounts of electrum, native gold, native silver, and silver sulfides. In 2013, Anglo Gold reported an updated reserve and resource estimate for Cerro Vanguardia. Total reserves and resources amounted to 48.9 Mt grading 2.6 g/t gold and 53.2 g/t silver for a total of about 130,000 kg of gold and 2.6 million kilograms (Mkg) of silver. The total reserve estimate included proven and probable reserves of about 19 Mt of ore containing 52,450 kg of gold and 994,500 kg of silver (AngloGold Ashanti Ltd., 2014, p. 136–138)

At Barrick Gold Corp. of Canada's wholly owned Veladero Mine, 19,935 kg of gold was produced from 29.1 Mt of processed ore compared with 23,822 kg of gold from 27.7 Mt of processed ore in 2012. Barrick expected to produce about 21,000 kg of gold in 2014. The average grade was 0.9 g/t in 2013 compared with 1.1 g/t in 2012. The Veladero Mine's first full year of production was in 2006. The highest reported average mill head grade from Veladero of 2.0 g/t was reported in 2006, but the grade had remained between about 0.9 g/t and 1.7 g/t since that time. The operation had the capacity to process 85,000 t/d of ore from an open pit mine into dore. Mineralization at Veladero is the result of epithermal alteration and infill of brecciated dacite and rhyodacite host rocks associated with the Cerro Pelado and the Filo Federico diatreme structures. Ore minerals include arsenopyrite and pyrite (Barrick Gold Corp., 2009; 2011, p. 3; 2014).

At the San Jose Mine [jointly owned by Hochschild Mining Plc of the United Kingdom (51%) and McEwen Mining Inc. of Canada (49%)], which was primarily a silver mine, 3,074 kg of gold was produced compared with 2,667 kg in 2012. McEwen expected the mine to produce about 4,800 kg of gold in 2014. San Jose commenced operations in 2007. The highest average grade of gold was 7.1 g/t in 2007, but the grade decreased each year until 2012, when it was 5.7 g/t. In 2013, however, the grade of gold was 6.4 g/t. The operation had the capacity to produce 1,500 t/d of ore from an underground mine into concentrate, dore, and precipitates. Total reserves and resources as of yearend 2013 included 6.3 Mt grading 496.9 g/t silver and 7.4 g/t gold for a total of 3.1 Mkg contained silver and 46,155 kg of gold. Mineralization at the San Jose Mine is controlled by regional faults in a belt extending 15 km and is associated with breccia fill, stockwork, and veins in a low-sulfidation epithermal system of Jurassic volcanic and volcaniclastic rocks (Hochschild Mining Plc, 2009, p. 10–11; McEwen Mining Inc., 2014, p. 1–2).

Pan American Silver Corp. of Canada's wholly owned Manantial Espejo Mine in Santa Cruz Province, which is also primarily a silver mine, produced 1,892 kg of gold from 719,607 t of ore in 2013 compared with 1,348 kg from 734,355 t of ore in 2012. The Manantial Espejo Mine commenced operations in 2009. The average mill head gold grade was 2.8 g/t in 2013 compared with 1.9 g/t in 2012. The highest average grade of gold of 3.8 g/t was processed in 2009 and had decreased each year since that time. As of yearend 2013, total reserves and resources included 11.1 Mt grading 1.5 g/t gold and 110.1 g/t silver for a total of 1.2 Mkg of contained silver and 17,148 kg of gold. In February 2014, Pan American updated the reserve and resource estimate at the Manantial Espejo Mine to include proven and probable reserves of 4.3 Mt of ore grading 138.9 g/t silver and 2.1 g/t gold. Mineralization is associated with quartz veins at fault intersections in a high-level epithermal system. The operation had the capacity to process 2,000 t/d of ore from open pit and underground mining to produce dore (Pan American Silver Corp., 2012, 2014).

At Yamana Gold Inc. of Canada's Gualcamayo Mine in Santa Cruz Province, 3,742 kg of gold was produced compared with 4,582 kg in 2012. The decrease was owing to the mine's phase 3 transition to underground operations. The operation had the capacity to process 36,000 t/d of ore, and Yamana expected to produce about 5,300 kg of gold in 2014. At Gualcamayo, mineralization is associated with epithermal alteration from a Tertiary intrusive that cuts through thrusted Paleozoic carbonate and clastic sediments (Yamana Gold Inc., 2014).

At Troy Resources Ltd. of Australia's wholly owned Casposo Gold Mine in San Juan Province, 2,155 kg of gold was produced from 427,709 t of ore in 2013 compared with 2,208 kg from 315,670 t of ore in 2012, which was the mine's first full year in operation after commencing production in 2011. The operation had the capacity to process 1,100 t/d of ore from open pit and underground mining to produce concentrates and dore. The average mill head gold grade was 8.0 g/t and 7.5 g/t in 2012 and 2011, respectively. In 2012, Troy Resources projected gold production for 2014, 2015, and 2016 of about 2,300 kg, 1,700 kg, and 949 kg, respectively. Mineralization at Casposo is associated with epithermal alteration by dike, stockwork, and vein intrusions into a rhyolitic to dacitic volcanic unit. Ore minerals include argentite, chalcopyrite, electrum, pyrite, and silver (Troy Resources Ltd., 2011; 2012a, p. 17; 2012b, p. 24–35, 35; 2013, p. 5).

Yacimientos Mineros de Agua de Dionoso (YMD) of the Catamarca Province's Fallaron Negro Mine had been in continuous operation since 1978. The operation was supported by partnerships with the National University of Tucuaman and the government of Catamarca Province. The company produced gold and silver from low-sulfidation epithermal vein deposits. Production figures were not publicly available. YMD also held a 20% royalty share in the Alumbrera operation.

Silver and Zinc.—The Manantial Espejo Mine produced about 97,781 kg of silver in 2013 compared with 112,985 kg in 2012. Pan American expected to process 3.8 Mt of ore in 2014. San Jose Mine produced 197,696 kg of silver from 6.4 Mt of ore compared with 185,145 kg of silver from 6.0 Mt of ore in 2012. The average mill head silver grade was 425 g/t in 2013. The silver grade had increased each year since 2010. Silver Standard Resources Inc. of Canada's wholly owned Pirquitas Mine in Jujuy Province produced 255,020 kg of silver and 12,247 t of zinc in 2013 compared with 268,236 kg of silver and 5,072 t of zinc in 2012. The volume of ore processed in 2013 was not available, and the average mill head gold grade is estimated to have been about 200 g/t based on data for the previous 4 years (that is, since the operation commenced commercial production). The operation had the capacity to process about 6,000 t/d of ore from an open pit mine to produce mineral concentrates. The Pirquitas deposit is an epithermal vein deposit. Ore minerals include cassiterite, miargyrite, pyrargyrite, pyrite, and tetrahedrite (Minera Andes, 2011; Pan American Silver Corp., 2011, p. 9; Canada News Wire, 2014; McEwen Mining Inc., 2014; Silver Standard Resources, Inc., 2014).

Industrial Minerals

Lithium.—In 2013, ADY Resources Ltd. was producing lithium from its wholly owned integrated facility at the Salar del Rincon in Salta Province. The operation had the capacity to produce 1,200 t/yr of lithium carbonate from a pilot plant. ADY Resources was completing a feasibility study for constructing a plant to process 30,000 t/yr of lithium carbonate. In December 2013, Orocobre Ltd. of Australia announced that construction at its 66.5%-owned Salar de Olaroz brine project in Jujuy Province was 70% complete. Orocobre had begun commissioning the first production wells and filling the first evaporation pond in September 2013. The operation was expected initially to produce 17,500 t/yr of lithium and another 10,000 t/yr of potash within 2 years of startup. The operation's expected life was 40 years (Clarke, 2012).

Potash.—The total capital expenditure required to complete the Rio Colorado project was estimated to be $5.9 billion by yearend 2012, but by the spring of 2013, Vale announced a revised estimate of $11 billion. At yearend 2012, the project was about 45% complete and carried a total realized expenditure of between $2.2 billion and $2.5 billion. By March 2013, Vale had suspended the Rio Colorado project indefinitely, citing inflation and exchange rate fluctuations as the reasons for the suspension. Rio Colorado had been projected to be one of the largest foreign capital investments in Argentina's history and would have placed the country as the leading supplier of potash to Brazil. Brazil had relied upon imports from Russia and Canada for 90% of its potash consumption. Argentina had expected to employ 6,000 workers at Rio Colorado and had been counting on exports from the mine to maintain a trade surplus. Once the mine opens, it was expected to ramp up to a production volume of 2.4 million metric tons per year (Mt/yr) of potash and ultimately to produce 4.3 Mt/yr of potash after a second phase of development began. All production from the mine was to have been exported to Brazil (Kiernan, 2013).

Mineral Fuels

Petroleum and Natural Gas.—According to the U.S. Energy Information Administration (EIA), Argentina's Vaca Muerta shale formation in the Neuquin basin was estimated to contain 16.2 billion barrels of shale oil and 8.7 trillion cubic meters of natural gas. Vaca Muerta appears to be a lucrative field, but exploration would need to continue to determine the quantity of reserves. The EIA had previously downgraded its estimate for Argentina's Chaco Parana basin to 85 billion cubic meters of natural gas from an original 4.6 trillion cubic meters. Initial production trials by Exxon Mobil Corp. at Vaca Muerta resulted in production of 770 barrels per day (bbl/d) of oil; Chevron Corp. and Yacimientos Petroliferos Fiscales S.A. (YPF) had formed a $1.4 billion joint venture to develop another concession that had been producing 24,000 bbl/d. Obstacles to development still remained in the form of Government controls on pricing and export taxes on oil and gas output. The cost of developing Vaca Muerta was estimated to be at least $140 billion, but energy companies were already steering clear of investing in Argentina's hydrocarbon sector owing to the increased costs of operating in Argentina, currency controls that increased the price of imported equipment, and the Government's nationalization in 2012 of Repsol YPF of Spain's share in YPF after Repsol made the big discoveries of shale gas at Vaca Muerta (Economist, The, 2014).

Crude petroleum production decreased by 2% in 2013 compared with that of 2012 to about 204 million barrels. About 54 different companies were involved in production of petroleum in the country in 2013; however, five companies accounted for 80.5% of the total. YPF accounted for 36.8% of total production; Tecpetrol S.A. (a wholly owned subsidiary of the Techint Group of Italy) accounted for 19%; Pan American Energy (Sucursal Argentina) LCC [an Argentine subsidiary of BP p.l.c. of the United Kingdom (60%) and the Bridas Corp. of Argentina (40%)] accounted for 17.6%; Sinopec Argentina Exploration Inc. (the Argentine subsidiary of China Petroleum and Chemical Corp.) accounted for 6.6%, and Pluspetrol S.A. of Argentina accounted for 3.7% (Instituto Argentino del Petroleo y del Gas, 2014).

Natural gas production decreased by about 5% in 2013 compared with that of 2012 to about 41.7 billion cubic meters. The leading producers were Total Austral S.A. and YPF, which accounted for 29.6% and 25.3%, respectively, of the total. Pan American Energy (Sucursal Argentina) accounted for 11.4% of the total; Petrobras Energia S.A. of Brazil, 8.5%; Tecpetrol, S.A. 3.2%; Pluspetrol, 3%; and Petrolera LF Co. S.R.L. of Argentina, 2.8% (Instituto Argentino del Petroleo y del Gas, 2014).

Outlook

In 2013, the value of the Argentine peso, when measured against the official exchange rate with the U.S. dollar, decreased by about 20%. The International Monetary Fund predicted that economic activity in Argentina would decrease in 2014. The country's high inflation, depleted foreign exchange reserves, and the discrepancy between the official and the market exchange rates were attributed to loose macroeconomic policies, and the country's economic outlook was reported to be highly uncertain by early 2014 (International Monetary Fund, 2014, p. 61).

Argentina continued to develop its continental brine deposits, but global commodity prices and market demand were expected to affect the rate and magnitude of development. At the end of 2012, the combined design capacity of the country's advanced projects was nearly 78,000 t/yr of lithium carbonate equivalent, or nearly 15,000 t/yr of lithium metal, which would exceed the annual production of lithium metal from Australia (12,800 t in 2012) and Chile (13,200 t in 2012). Orocobre planned to commence commercial operations at Salar Olaroz in the third quarter of 2014 to produce battery-grade lithium carbonate. Other lithium projects that were projected to start up in 2015 included the Cauchari-Olaroz, the Salar de Diablillos, and the Sal de Vida projects. The San Jorge and El Pachon copper projects were expected to start up in 2015 and 2016, respectively (Jaskula, 2014; Orocobre Ltd., 2014).

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TABLE 1
ARGENTINA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013[e]
METALS						
Aluminum, primary		412,594	417,088	416,177	413,395	440,176 [3]
Cadmium:						
Mine output, Cd content		131	124	120 [e]	144 [r, 3]	109 [3]
Refined		36	32	31	37 [r, 3]	35
Copper:						
Mine output, Cu content		143,084	140,318 [r]	116,829	135,837	109,588 [3]
Refined, secondary[e]		16,000	16,000	13,000	13,000 [r, 3]	14,000
Gold, mine output, Au content	kilograms	46,588	63,138	59,140	54,651 [r]	50,650
Iron and steel:						
Metal:						
Pig iron	thousand metric tons	2,042	2,532	2,795	2,076	2,450 [3]
Sponge iron (direct reduction)	do.	807	1,566	1,675	1,607	1,466 [3]
Total	do.	2,849	4,098	4,470	3,683	3,916 [3]
Ferroalloys, electric furnace:[e]						
Ferrosilicomanganese		6,644 [3]	10,900	11,000	11,000	11,000
Ferrosilicon		11,300	11,000	11,000	11,000	11,000
Steel, crude	thousand metric tons	4,014	5,138	5,610	4,996	5,188 [3]
Semimanufactures	do.	4,991 [r]	6,537 [r]	6,853 [r]	6,371 [r]	6,654 [3]
Lead:						
Mine output, Pb content		24,753	22,554	26,074	26,475 [r, 3]	26,000
Refined:						
Primary		12,558	14,245	11,859	16,445 [r, 3]	13,800
Secondary[e]		70,000	63,000	72,700	73,820 [r, 3]	69,900
Total[e]		82,600	77,200	84,600	90,265 [r, 3]	83,700
Molybdenum		556	468	820	1,600	845
Silver, mine output, Ag content	kilograms	532,823	723,238	747,449	799,277 [r, 3]	843,600
Zinc:						
Mine output, Zn content		31,869	32,566	33,975	34,000	47,700
Metal, smelter:						
Primary		32,989	39,540	42,067	37,797	36,712 [3]
Secondary		2,639	3,163	3,230	2,844 [r, 3]	2,640
Total		35,628	42,703	45,297	40,641 [r, 3]	39,300
INDUSTRIAL MINERALS						
Asbestos		322	341	105	102 [r, 3]	100
Barite		3,416	2,944	5,528	9,416 [r, 3]	9,000
Boron materials, crude		505,983	622,968	648,806	479,412 [r, 3]	500,000
Cement, hydraulic	thousand metric tons	9,385	10,423	11,592	10,716	11,892 [3]
Clays:						
Bentonite		148,099	229,301	228,357	193,795 [r, 3]	200,000
Common		6,941,736	7,313,420	8,323,888	8,034,080 [r, 3]	7,600,000
Kaolin		78,792	78,722	54,166	66,574 [r, 3]	70,000
Diatomite		62,270	54,467	60,651	278,126 [r, 3]	100,000
Feldspar		213,551	217,213	216,721	273,896 [r, 3]	230,000
Fluorspar		13,424	17,657	25,099	35,874 [r, 3]	23,000
Gypsum, crude		1,355,260	1,346,535	1,452,797	1,432,517 [r, 3]	1,400,000
Lithium:						
Carbonate		8,574	11,178	10,008 [r, 3]	10,201 [r, 3]	9,000
Chloride		4,279	6,644	4,009 [r, 3]	3,741 [r, 3]	4,200
Mica		8,668	9,638	10,226	5,785 [r, 3]	7,500
Peat, agricultural (turba)		7,752	6,345	6,329	6,639 [r, 3]	6,000
Perlite		21,802	27,182	27,446	24,663 [r, 3]	25,000

See footnotes at end of table.

TABLE 1—Continued
ARGENTINA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2009	2010	2011	2012	2013[e]
INDUSTRIAL MINERALS—Continued						
Pozzolan[e]		6,000	7,582 [3]	7,500	7,500	7,000
Pumice		7,020	7,582	6,445	6,252 [r, 3]	7,000
Salt, common		1,477,532	1,532,124	1,888,676 [r, 3]	1,843,975 [r, 3]	1,500,000
Sand and gravel:						
Sand:						
Construction		27,183,525	31,345,764	33,455,151	32,133,801 [r, 3]	31,000,000
Silica sand (glass sand)		364,157	531,161	516,772	615,256 [r, 3]	500,000
Gravel		19,591,112	22,237,877	22,738,950 [r, 3]	19,442,151 [r, 3]	21,000,000
Stone:						
Basalt		2,116,582	1,652,032	917,294	3,147,922 [r, 3]	2,000,000
Calcareous:						
Calcite		137,931	178,504	209,809	223,049 [r, 3]	200,000
Dolomite, including crushed		1,252,643	1,524,713	1,589,599	1,561,861 [r, 3]	1,500,000
Limestone		15,746,676	17,309,763	19,757,372 [r, 3]	19,855,622 [r, 3]	18,000,000
Marble, onyx, travertine		152,911	162,281	165,959 [r, 3]	169,383 [r, 3]	160,000
Shell, marl		353,137	425,872	467,978	487,633 [r, 3]	425,000
Crushed, unidentified		19,663,410	22,237,877	22,638,657	20,000,000	20,000,000
Flagstone		197,877	147,923	184,023 [r, 3]	189,493 [r, 3]	180,000
Gemstones	kilograms	119,650	45,054	45,000 [e]	11,916 [r, 3]	20,000
Granite, in blocks		79,111	153,792	82,661	72,913 [r, 3]	100,000
Quartz, crushed		218,218	228,679	232,461	216,697 [r, 3]	200,000
Quartzite, crushed		946,682	1,164,418	1,292,503	1,370,053 [r, 3]	1,200,000
Rhodochrosite	kilograms	122,117	122,839	120,673	87,243 [r, 3]	115,000
Serpentine, crushed		142,000	192,000	245,000	237,000 [r, 3]	200,000
Strontium minerals, celestite		8,169	8,512	1,056	22,750 [r, 3]	10,000
Sulfates, natural:						
Magnesium (epsomite)		1,650	1,704	1,724	1,784 [r, 3]	1,800
Sodium (mirabilite)		18,267	16,225	12,126	48,389 [r, 3]	20,000
Talc and related materials		22,762	24,820	24,379	23,576 [r, 3]	25,000
Vermiculite		2,150	2,500	1,000	320 [r, 3]	1,000
MINERAL FUELS AND RELATED MATERIALS						
Asphalt and bitumen:						
Natural (asphaltite)		6,210	4,576	2,940	1,411 [r, 3]	1,500
Byproduct of refinery		641,420	631,825 [r]	675,164 [r]	531,831 [r]	607,207 [3]
Coal, bituminous	thousand metric tons	181	140	178	245 [r, 3]	250 [3]
Coke	do.	1,413 [3]	1,398 [r]	1,393 [r]	1,474 [r]	1,343
Gas, natural, gross	million cubic meters	48,418	47,499	45,620 [r]	44,123 [3]	41,708 [3]
Natural gas liquids[e]	thousand 42-gallon barrels	10,100	10,000	10,000	10,000	10,000
Petroleum:						
Crude	do.	211,255	224,077	207,960	207,878 [3]	203,639 [3]
Refinery products:[e]						
Liquefied petroleum gas	do.	14,327 [3]	14,563 [3]	9,937 [3]	10,000	10,000
Motor gasoline	do.	47,700 [r]	48,600 [r]	54,100 [r]	57,700 [r]	55,000
Jet fuel (kerosene)	do.	12,600 [r]	10,400 [r]	10,000	13,300 [r]	14,000
Kerosene	do.	109 [r, 3]	431 [r, 3]	352 [r, 3]	198 [r, 3]	250
Fuel oil	do.	2,319 [3]	2,810 [3]	2,123 [3]	2,390 [3]	2,400
Lubricants	do.	2,456 [3]	2,476 [r, 3]	2,335 [r, 3]	2,210 [r, 3]	2,000
Other	do.	188,993 [3]	189,000	189,000	200,000	200,000
Total	do.	268,504 [3]	268,280 [3]	267,847 [3]	285,798 [r, 3]	284,000

[e] Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r] Revised. do. Ditto.

[1] Table includes data available through September 1, 2014.

[2] In addition to the commodities listed, Argentina also produces ammonia, antimony, iron ore, mercury, and urea, but available information is inadequate to make reliable estimates of output.

[3] Reported figure.

TABLE 2
ARGENTINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	Aluar Aluminio Argentino S.A.I.C. [private, 77%; Government, 10%; National Social Security Administration, 13%]	Abasto, Buenos Aires Province, and Puerto Madryn, Chubut Province	460.
Boron	Borax Argentina S.A.	El Porvenir Mine and plant, Jujuy Province; Sijes, Porvenir, and Tincalayu Mines and plants, and Campo Quijano refinery, Salta Province	100.
Do.	Procesadora de Boratos Argentinos S.A. (Ferro Corp.)	Loma Blanca Mine, Jujuy Province, and plant at Palpala, Jujuy Province	36.
Do.	Ulex S.A. (private, 100%)	Pastos Grandes, Salta Province	2.
Cement	Cementos Loma Negra C.I.A.S.A. (private, 100%)	Buenos Aires, Catamarca, Cordoba, Corrientes, Jujuy, Neuquen, and San Juan Provinces	6,000.
Do.	Cementos Avellaneda, S.A. (Corporación Uniland S.A. and C. Molins International S.A.)	La Calera plant, San Luis Province, and Olavarria plant, Buenos Aires Province	2,800 cement, 220 lime.
Do.	Juan Minetti S.A. (Holcim Ltd., 100%)	Cordoba, Jujuy, and Mendoza Provinces	1,700.
Coal	Yacimientos Carbonífero Río Turbio S.A. (private, 100%)	Rio Turbio, Santa Cruz Province	210.
Copper, gold, and molybdenum[1]	Minera Alumbrera Ltd. (Glencore Xstrata plc, 50%; Goldcorp, Inc., 37.5%; Yamana Gold, Inc., 12.5%)	Alumbrera Mine, Catamarca Province	40,000.
Fluorite	Fluorita Cordoba S.A. (private, 100%)	Mine and flotation plant, Cerro Negros, Cordoba Province	NA.
Gold and silver[1]	Cerro Vanguardia S.A. [AngloGold Ashanti Ltd., 92.5%, and FOMICRUZ S.E. (Government of Santa Cruz Province), 7.5%]	Cerro Vanguardia Mine, Santa Cruz Province	924.
Do.	Minera Santa Cruz (Hochschild Mining plc, 51%, and McEwen Mining Inc., 49%)	San Jose Mine, Santa Cruz Province	550.
Do.	Minera Argentina Gold (Barrick Gold Corp., 100%)	Veladero Mine, San Juan Province	28,000.
Do.	Troy Resources Ltd. (private, 100%)	Casposo Gold Mine, San Juan Province	438.
Do.	Pan American Silver Corp., 100%	Manantial Espejo Mine, Santa Cruz Province	730.
Do.	Yacimientos Mineros de Agua de Dionisio (Government, 100%)	Farallon Negro, Hualfin, and Belen Mines, Catamarca Province	NA.
Do.	Yamana Gold, Inc., 100%	Gualcamayo Mine, San Juan Province	13,000.
Iron and steel	Siderar S.A.I.C. (Ternium S.A., 60.93%)	San Nicolas, Buenos Aires Province	2,880 steel, 4,500 semimanufactures.
Do.	Acindar S.A. (AcelorMittal Group, 65%)	Plant Nos. 1 and 3, Buenos Aires Province; and Plant No. 2, near Rio Parana, Santa Fe Province	1,350 steel, 1,000 DRI.[2]
Do.	Siderca S.A.I.C. (Techint Group)	Buenos Aires Province	900 steel, 670 DRI.[2]
Iron ore[1]	MCC Minera Sierra Grande S.A.	Sierra Grande, Rio Negro Province	320 iron ore.
Lead and silver	do.	Palpala smelter, Jujuy Province	NA.
Lead, silver, and zinc	Silver Standard Resources Inc., 100%	Pirquitas Mine, Jujuy Province	2,000.
Do.	AR Zinc Group (100%)	Aguilar Mine, Jujuy Province	705.
Lithium metric tons	Minera del Altiplano S.A. (FMC Corp.)	Salar del Hombre Muerto, Salta Province; plants in Catamarca Province	23,000.

See footnotes at end of table.

TABLE 2—Continued
ARGENTINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[1]
Petroleum	million 42-gallon barrels	YPF S.A.	Chubut, Formosa, Jujuy, La Pampa, Mendoza, Neuquen, Rio Negro, Salta, Santa Cruz, and Tierra del Fuego Provinces	366.
Do.	do.	Pan American Energy (Sucursal Argentina) LLC (BP p.l.c., 60%, and Bridas Corp., 40%)	Offshore Chubut and Santa Cruz Provinces	100.
Do.	do.	Chevron Argentina S.R.L. (Chevron Corp., 100%)	El Trapial field, Neuquen Province, and other concessions	46.
Do.	do.	Petrobras Energia S.A. (Petroleo Brasileiro S.A., 100%)	La Pampa, Mendoza, Neuquen, Rio Negro, Salta, and Santa Cruz Provinces	15.
Do.	do.	Petro Andina Resources Ltd. (Pluspetrol S.A., 100%)	Neuquen basin	10.
Do.	do.	Tecpetrol S.A.	Golfo San Jorge basin, Neuquen basin, Northwest basin	10.
Do.	do.	Total Austral S.A. (Total S.A., 100%)	Neuquen Province	NA.
Zinc		AR Zinc Group	AR Zinc smelter, Santa Fe Province	NA.

Do., do. Ditto. NA Not available.

[1] Mill capacity per year.

[2] Abbreviations used in this table for commodities include the following: DRI—direct-reduced iron.

THE MINERAL INDUSTRY OF BOLIVIA

By Susan Wacaster

Bolivia is a globally important supplier of bulk ores and mineral concentrates. In 2013, the country was estimated to have produced 8% of the world's total mine output of tin; silver, 5%; antimony and zinc, 3% each; and lead and tungsten, about 2% each. Most of the volume of Bolivia's mineral production was exported in raw form by rail to ports on the coasts of Argentina, Brazil, Chile, and Peru and then shipped to processing facilities located in Asia, Europe, and North America. Bolivia's mineral resources have not been fully explored or developed. In addition to the minerals listed above, Bolivia is thought to have globally relevant resources of cadmium, chromium, gold, indium, iron ore, lithium, nickel, palladium, platinum, potash, and tantalum (George, 2014; Guberman, 2014a, b; Shedd, 2014; Tolcin, 2014a, b).

In 2013, the Government of Bolivia announced that it planned to increase production of tin at state-owned operations. The production capacity of the Vinto smelter was targeted to be increased to 30,000 metric tons per year (t/yr) by 2025, supported by increased average annual mine production of tin in concentrate from the Colquiri and Huanuni Mines (combined) of about 22,600 metric tons (t). As of June, there had been no exploratory drilling for nonfuel minerals compared with 3,000 meters (m) that had been drilled in the same period of 2012. No new major mining projects were started in 2013 owing in part to decreasing prices for Bolivia's mineral exports in the global market and uncertainty regarding tax increases to mining companies as the pending mining bill still had not been enacted (Kovars, 2013; ITRI Ltd. 2014a).

Bolivia is divided into six physiographic provinces east to west—the Precambrian Shield, the Chaco-Beni Plain, the sub-Andean zone, the eastern Cordillera, the Altiplano, and the western Cordillera. The latter four provinces make up the Mesozoic-Cenozoic Central Andes Mountains in Bolivia, which host mineral deposits that have been mined for centuries. Along with Bolivia's Central Andes, the Precambrian Shield and the Chaco-Beni Plain are part of three important South American metallogenic provinces that extend beyond the country's borders (Arce-Burgoa and Goldfarb, 2007).

In the Precambrian Shield of eastern Bolivia (Guapore Craton), the presence of significant gold resources is indicated by auriferous veins and placers near the Brazilian border in the area of the Paragua Craton gold and manganese belt, which has been mined artisanally since the 1700s. Disseminated- to massive-polymetallic sulfide deposits are associated with Neoproterozoic rift basins in the southern part of the Bolivian Precambrian Shield, especially in the Tucavaca basin. Disseminated copper, lead, and zinc mineralization and veins of barite, galena, and quartz in oxidized clastic rock sequences and reduced black shale units of the basin are interpreted to indicate undiscovered sedimentary exhalative deposits. Lead-and-zinc-rich zones in ferruginous dolomites and stromatolitic reef formations in the northern part of the Tucavaca basin are interpreted to be potential Mississippi Valley-type mineralization. The Precambrian Shield province hosts copper-, gold-, silver-, and zinc-bearing volcanic massive sulfide occurrences, massive-to-laminated pyrite- and chalcopyrite-bearing bodies (with and without galena and sphalerite) in bimodal volcanic rhyolite and metasedimentary mesoproterozoic rocks, and a series of mineral occurrences associated with 1-billion-year-old pegmatites intruded into schist that are favorable for the occurrence of beryllium, niobium, tantalum, thorium, tin, and uranium; and rift-related rare-earth-element-mineralized alkaline syenites (Arce-Burgoa and Goldfarb, 2007).

The Mutun-Tucavaca ferromanganiferous belt hosts moderately high-grade banded iron formations, including the Mutun, the Cerro Rojo, and the Cerro Colorade-Murcielago deposits located in grabens of the Tucavaca basin. The Bolivian central Andes area is characterized by mineralized belts hosting Miocene to Pliocene red bed copper deposits; epithermal precious metal deposits; orogenic gold in slate belts; platinum-group metals and nickel in mafic and ultramafic intrusions; base metals in volcanogenic massive sulfide and sedimentary exhalative deposits; banded iron formations; the salars of the Altiplano and western Cordillera; the Miocene tin belt; Paleozoic antimony and gold belts; and the lead and zinc belt of the eastern Cordillera. The Chaco-Beni Plain contains one of the world's major alluvial gold concentrations, which has its source region in the high elevations of the eastern Cordillera of northern Bolivia (Arce-Burgoa and Goldfarb, 2007).

Minerals in the National Economy

Bolivia's gross domestic product (GDP) in 2013, which was valued at $30.6 billion, increased by 6.8%; this growth rate was second only to Panama in the Latin America region and double that of the GDP growth rate of South America as a whole. The hydrocarbon sector led the economic growth in Bolivia followed by the communication, storage, and transportation sector (Banco Central de Bolivia, 2014a, p. 147; 2014c). According to estimates for 2012 and 2013, the value of activity in the natural gas and crude petroleum sector accounted for about 14% of the country's GDP in 2013 compared with 14.7% in 2012, and the value of metallic and nonmetallic minerals accounted for 2.9% in both years. The industrial manufacturing sector accounted for 6.1% of the GDP in 2013 (Banco Central de Bolivia, 2014a, p. 149). The value of the country's production of natural gas and crude petroleum increased by 14% in 2013 after increasing by about 14.7% in 2012 and 7.2% in 2011; that of nonfuel minerals increased by 2.9% after decreasing by 5% in 2012 and increasing by 3.4% in 2011 (Banco Central de Bolivia, 2014a, p. 147).

Preliminary data for 2013 indicated that the value of Bolivia's marketed production of minerals decreased by 18% compared with that of 2012 to about $3.1 billion. The greatest decrease in value was for gold, the value of which decreased by 48.7%

compared with that of 2012. Silver continued to generate the most value. The marketed value of silver was about $1 billion followed by that of zinc ($757 million), gold ($562 million), tin ($370 million), antimony ($51.7 million), and wolframite (tungsten) ($30.2 million). The value of marketed production of other minerals (unclassified) was $292.7 million, of which the value of other metals (unclassified) was $74 million. The value of exported hydrocarbon products increased by 11.3% in 2013 to $6.6 billion. Natural gas exports accounted for 92.3% of the total value; diesel oil and crude petroleum combined accounted for 6.7%; and other fuels (fuel oil, gasoline, and liquefied natural gas) accounted for less than 0.1% (Banco Central de Bolivia, 2014a, p. 93).

According to preliminary data from the Central Bank of Bolivia (BCB), Government revenue from royalties charged to private mining companies was $153.3 million in 2013 compared with $141.1 million in 2012. Annual revenues from other taxes on the mining sector were not available. In 2013, Government revenue from direct sales of hydrocarbons increased to $6.9 billion from $5.8 billion in 2012, and that from taxes on the hydrocarbon sector increased to $425.2 million from $356.7 million in 2012. With respect to the hydrocarbon sector, royalty rates of 11% of marketed production were levied in the Chuquisaca, the Cochambabma, the Santa Cruz, and the Tarija Departments where hydrocarbon products were produced. The value of production of hydrocarbon products alone accounted for between 5% and 7% of the GDP each year from 2004 through 2010 (the latest year for which data were available by sector and Department), and the sales of natural gas to Argentina and Brazil alone generated more than 50% of revenue to the national treasury (Gonzálo, 2013, p. 2, 14, 18; Banco Central de Bolivia, 2014a, p. 177; Instituto Boliviano de Comercio Exterior, 2014).

Preliminary data from the Instituto Boliviano de Comercio Exterior indicate that gross foreign direct investment (FDI) in Bolivia in 2013 reached a maximum value of about $2 billion. The flow of FDI into the exploration for and production of crude petroleum and natural gas increased to $1.4 billion in 2013 from $946.2 million in 2012, and the flow of FDI into the mining and quarrying sector decreased to $151 million from $218.9 million. The leading source of FDI in the Bolivian economy was the United States ($676 million), followed by Switzerland ($346.7 million), the United Kingdom ($309.1 million), and France ($219.5 million), the total of which accounted for 76% of the FDI received in 2013. In 2013, the industrial manufacturing sector replaced the mining and quarrying sector as the second-ranked recipient of FDI. In 2013, Potosi Department received mining royalties of $96.2 million, or 58% of the total mining royalties in the country and $74.5 million in the first 9 months of 2014. In the first half of 2014, Bolivia's net FDI decreased by 1% compared with the same period in 2013. The bulk of FDI was received by the hydrocarbon sector ($567 million), followed by industrial manufacturing ($133 million) and the mining and quarrying sector ($95 million) (Banco Central de Bolivia, 2014b; Instituto Boliviano de Comercio Exterior, 2014; Ministerio de Minería y Metalurgia, 2014).

Government Policies and Programs

On January 25, 2009, Bolivians approved a new Constitution, which was enacted on February 7. The Constitution stipulates that Bolivian investment will be prioritized over foreign investment (Article 320)—a potentially important change in terms of foreign investment that established that Bolivia would no longer recognize international arbitration courts; economic activity cannot damage the collective good (Article 47); transferring national resources that are the social property of the Bolivian people in favor of companies, people, or foreign states can be considered an act of treason (Article 125); and Bolivian constitutional law supersedes international law and treaties (Article 410), the latter of which led the Bolivian Government to revoke the bilateral investment treaties (BIT) with the United States and other countries in order to be in compliance with the new Constitution (U.S. Department of State, 2014, p. 1–2).

The new Constitution had yet to be fully implemented by the end of 2013, but it was aimed at strengthening state control over key economic sectors, including the hydrocarbon and mining sectors. In accordance with the principles of the Constitution, the Government worked out a first draft of a new mining law to replace the Mining Code of 1997 (law No. 1777 of March 17, 1997), and the draft mining law was completed in January 2011. In March 2011, the Government established a commission to finalize the new mining law, but by yearend 2013, the new mining law had not been approved.

In 2013, law No. 367 was passed to identify mines deemed by the state to be unproductive, inactive, or idle. Under this law, the Government would be allowed to reassign recovered areas to other entities in accordance with a mining development plan. Companies that lose concessions would not be entitled to compensation. The law would not apply to concessions held by the state-owned Corporación Minera de Bolivia (COMIBOL) and did not grant any rights to unauthorized or illegal miners. As well as lack of activity, contracts could be rescinded for other reasons, including failure to register a mined area with the Servicio Nacional de Geología y Técnico de Minas (SERGEOTECMIN). Law no. 367 incorporated into the Penal Code the crime of illegal occupation of mining areas and established sentencing guidelines of between 4 and 8 years in jail for individuals who appropriate any deposit or market mineralogical reserves without authorization from COMIBOL. The responsibility of determining whether a concession is idle or not was assigned to the Vice Ministry of Auditing and Regulatory Policy in the Ministry of Mines (Demo-Dananberg, 2013a; Latinominería, 2014)

Production

Data on mineral production are in table 1. In terms of the quantity of mine production of metals, zinc continued to be the leading nonfuel commodity mined in Bolivia in 2013 followed by lead, tin, copper, antimony, and tungsten. The copper content of mine output increased by 52% in 2013 to 7,549 t; mine production of copper had increased steadily each year since 2009. The volume of primary refined copper increased by 40.6% to 1,271 t. Primary copper production had generally increased since 2009, although there was a small decrease in 2012 that did not correlate with the increasing production of mined copper output. Mine production of gold decreased by just 4.2%, but the volume of gold metal produced continued a steady decline since 2009 and decreased by 24.7% in 2013. The gross weight of tantalite increased by 11.9% to 46,558 kilograms (kg) in 2013; production of tantalite had increased every year since 2010.

Production of industrial minerals is typically variable and often depends on local economies, public works contracts, and other microeconomic considerations. Reported production of industrial minerals in 2013 was similar to that of 2012 except for the leading industrial mineral ulexite, for which production increased by 17.4% to 149,818 t in 2013. The amount of primary production from the hydrocarbon sector was relatively unchanged, with the exception of liquefied petroleum gas production, which increased by 28% in 2013. Production of refinery products is typically variable but within a relatively limited range dictated by refinery capacities. Decreases in the production of aviation gasoline and kerosene were more than compensated for by increases in other refinery products and total refinery product production increased in 2013 by 14% to 13.9 million barrels (table 1).

Structure of the Mineral Industry

Table 2 is a list of the major mineral industry facilities, together with the major owners and operators. Control of the extraction of natural resources in Bolivia had alternated between public and private control for decades. In 1952, a process of nationalizing the mineral industry took place as the Government monopolized the export and sale of all minerals, which was administered by the state-owned Mining Bank of Bolivia. COMIBOL was then created to administer state-run mines. Mines belonging to the three major tin companies were nationalized, but the country's medium-size mines were not. In the process, two-thirds of the mineral industry was turned over to COMIBOL. By 1985, the mineral industry in Bolivia had collapsed owing to the combined effects of political and economic conflicts (including political revolution and alternating civilian and military rule), decreased global prices for Bolivia's mineral commodity exports, and economic hyperinflation in 1984 and 1985. In 2006, COMIBOL began operating under a framework of natural resource recovery and mineral industry reactivation with responsibility for the direct management of the nation's state-owned mining centers (Morales and Sachs, 1987, p. 57; Corporación Minera de Bolivia, 2014).

In 1996, the oil and gas industries of Bolivia were privatized with direction from the International Monetary Fund and the World Bank as part of a plan to increase foreign investment in those industries. The hydrocarbon sector was then renationalized in 2006 to increase Government revenues that could be directed towards public programs for health, education, pensions, and poverty reduction. In 2013, mining participation in the country was composed of private mining companies (70%), mining cooperatives (21%), and state-owned mining companies (9%) (Lefebvre and Bonifaz, 2014).

Bolivia's mining collectives mine deposits that were explored and prepared for COMIBOL and pay 1% of the marketed value of extracted minerals to operate on their concessions. The income generated by cooperatives typically amounts to modest salaries for members, but as the prices of metals have remained high in recent years, the cooperatives have developed into a significant economic and social power. Bolivia's mining collectives are subsidized by the state in several ways—primarily by being exempt from paying income taxes. In the case of gold, the collectives pay five times less in royalties than mining companies, and the majority of mining cooperatives function as gold miners. The cooperatives receive donations of equipment and other inputs in order to operate and benefit from financial entities that were created exclusively for the benefit of the collectives and have their own mineral traders that are funded by the state along with other benefits.

In early 2014, about 100 mining cooperatives were understood to have partnered with private companies working mostly in Potosi and La Paz. By partnering with private companies, those cooperatives increased their earnings while remaining exempt from paying income taxes on the additional income, and the private companies benefited by gaining access to mining areas from which they had been restricted (Diario Página Siete, 2014).

COMIBOL held dozens of mining properties in various stages of development or environmental remediation. Producing mines that were partially or wholly owned by COMIBOL in 2013 included but were not limited to the Coro Coro copper mine [jointly owned by COMIBOL (55%) and Korea Resources Corp. of the Republic of Korea (45%)]; the Cerro Rico silver, tin, and zinc mine (COMIBOL, 100%); the Huanuni tin mine (COMIBOL, 100%); the Bolivar lead, silver, tin, and zinc mine (a joint venture between COMIBOL and Sinchi Wayra S.A., 50% each); the Colquiri silver, tin, and zinc mine (COMIBOL, 100%); and the Sinchi Wayra lead, silver, and zinc mine (a joint venture between COMIBOL and Sinchi Wayra S.A., 50% each) (table 2).

Mineral Trade

The value of exported goods from Bolivia increased by 2.3% in 2013 to $11.5 billion. The increase was driven by exports of natural gas and petroleum followed by nonmineral commodities, including garments, leather, jewelry, soy, and sugar products, which led exports of ores and concentrates of copper, gold, lead, silver, and wolframite (tungsten). Decreased international prices for Bolivia's exported goods and decreased external demand (particularly from euro area countries and China) had affected multiple sectors of the economy, including the agricultural and mineral sectors, leading to decreases in the marketed value of such major Bolivian exports as antimony and silver, as well as coffee and chestnuts. The value of natural gas exports, however, increased by 11.6% compared with that of 2012 owing to increased volume of exports to Argentina and Brazil (Banco Central de Bolivia, 2014b, p. 9–10).

In 2013, the value of goods imported to Bolivia increased by 12.9% to $9.4 billion. The increase was owing to the importation of capital goods and intermediate goods. Imports of intermediate goods accounted for 46.9% of the total value (an increase of 6.3% compared with those of 2012) and consisted primarily of construction materials and goods for the agricultural and industrial sectors. Imports of capital goods increased by 25% compared with those of 2012 to $2.9 billion owing to the acquisition of transportation equipment (Banco Central de Bolivia, 2014b, p. 9–10).

Preliminary data from the BCB indicated that the combined annual value of hydrocarbon and mineral exports decreased by 0.4% to about $9.6 billion in 2013. Hydrocarbon products accounted for 68.1% compared with 61.4% of the total in 2012. The annual value of nonfuel mineral exports decreased by 17% in 2013 to about $3.1 billion and accountes for 31.9% of the total value of mineral exports compared with 38.5% in 2012. The private sector, which included medium-scale mining, was the source of 91.1% of the value of nonfuel mineral exports, but it also experienced the greatest losses as the value of exports decreased to about $2.8 billion from $3.4 billion in 2012. Public sector exports, which included those from COMIBOL, increased by 15% to $273.3 million. The BCB's preliminary analysis of the variation in the value of mineral exports as a function of price and quantity effects between 2012 and 2013 indicated that the total variation in value for nonfuel minerals was a decrease of $625.7 million and that of hydrocarbons was an increase of $662.8 million (Banco Central de Bolivia, 2014b, p. 36, 44).

In 2013, COMIBOL exported 4,089 t of mineral concentrates valued at $9.5 million; medium-scale miners (which included some small-scale mining and large companies) exported 567,249 t of mineral products valued at $1.9 billion; and mining cooperatives exported 123,790 t of mineral products valued at $660.5 million. COMIBOL exported 12,541 t of metal valued at $263.8 billion. In 2013, 100% of Bolivia's reported production of antimony and wolframite (tungsten) was exported, as was 99.5% of silver production, 96.5% of zinc production, 87.8% of copper production, 85.8% of tin production, and 72.2% of gold producton. In terms of value, the United States received the greatest amount of nonfuel mineral exports from Bolivia ($829 million) followed by Japan ($406.8 million), China ($283.3 million), and Peru ($188.5 million). The total value of hydrocarbon products exported from Bolivia in 2013 was about $6.6 billion. Of that, Argentina and Brazil accounted for $2.4 billion and $3.9 billion, respectively, which together represented about 96.5% of the total (Banco Central de Bolivia, 2014b, p. 43, 49, 52)

Commodity Review

Metals

Antimony.—Since pre-Colonial times, Bolivia produced antimony from small but rich vein-type deposits often associated with gold. Many deposits, particularly those of the Caracota-Carma-Candelaria belt of the eastern Cordillera, are particularly enriched in antimony. These deposits typically have uniform mineralogy and preserve evidence of two distinct mineral paragenesis events. Products of the earlier event include arsenopyrite-, gold-, pyrite-, and tungsten-bearing minerals in milky quartz whereas a later event involved deposition of antimony-, copper-, lead-, and zinc-bearing sulfides in microgranular, bluish-gray quartz (Tri-Star Resources Plc, 2012, p. 3).

In May 2011, Shrewton Investments Ltd. of South Africa acquired a 70% ownership interest in the San Antonio deTuriri Mine and reestablished mine roads, tested the remaining tailings dumps, sampled outcrops, and reopened the Justo Juez shaft at the mine.

The Turiri Mine had been closed in 1978 when China entered the antimony market and international antimony prices collapsed in the late 1970s and 1980s. Prior to 1978, the mine produced high-grade ore, and mineral concentrate was produced onsite. As a result, there were four historic tailings dumps with a combined 21,500 t of material containing an average of 4% antimony that were economically feasible for flotation processing. Information was not available about primary production of antimony at the Turiri Mine in 2012 or 2013, but startup projections of capacity were expected to be about 200 metric tons per month (t/mo) of concentrate, which would be ramped up to 1,000 t/mo if a plant was commissioned (Amalgamated Gold and Silver Inc., 2014).

Iron Ore and Manganese.—In September 2013, the Bolivian Government announced that it was preparing to invite bids for a 50% share in the Mutún iron ore deposit and steel manufacturing facility. When Jindal Steel & Power Ltd. of India pulled out of the Mutún project in July 2012, the company reportedly had stockpiled an estimated 40,000 t of ore at Puerto Quijarro. In October 2011, the state-owned steel company Empresa Siderúrgica del Mutún (ESM) reportedly had exported about 10,000 t of iron ore from El Mutún to a steel company in Paraguay, Aceros del Paraguay S.A. (ACEPAR), and ESM had expected to resume exporting iron ore to ACEPAR in 2012. The United Nations reported about 6,000 t of iron ore exports to Paraguay from Bolivia in 2011 and about 9,200 t in 2012 as well as about 1,200 t of iron ore exports to China from Bolivia in 2013 (Jamasmie, 2013; United Nations Statistics Division, 2014).

Jindal had signed a 40-year contract in 2007 to mine the Mutún deposit with ESM and COMIBOL. Jindal had been granted the right to mine 50% of the reserves (estimated to be 40 billion metric tons) and to export 10 million metric tons per year (Mt/yr). The company agreed to construct a 10-Mt/yr-capacity pellet plant, a 6-Mt/yr-capacity sponge iron unit, a 1.7-Mt/yr-capacity steel plant, and a 450-megawatt powerplant. The total expected investment was $2.1 billion, which was the largest foreign investment contract signed in the history of Bolivia (equal to almost 12% of Bolivia's GDP in 2007), from which the Government was expected to earn $200 million per year for the duration of the contract. The contract was also the largest of its kind finalized by an Indian company in Latin America and was expected to generate subsequent opportunities for Indian investment. By July 2012, however, the contract had been terminated by Jindal. The Government stated that the company pulled out of the project owing to poor planning and insufficient funding. The company cited the lack of an approved contract for a sufficient supply of natural gas and a lack of sufficient infrastructure to be able to develop the site and to export the mine output (Viswanathan, 2013).

Silver and Zinc.—As of June 2013, Minera San Cristobal (MCS), a wholly owned subsidiary of Sumitomo Corp. of Japan and owner of the San Cristobal Mine, held 62 concessions in Bolivia, but was carrying out work on less than 10% of those concessions. MCS was, therefore, one of the companies that could potentially be affected by the passage of law No. 367. The Government stated publicly, however, in 2012 that it would not nationalize the San Cristobal Mine, which was the nation's most valuable mine and from which the Government received $150 million in taxes and royalties in 2011 (the most recent year for which data were available) (Ramos, 2012; Kovars, 2013).

At Empresa Minera Colquiri's Colquiri Mine, which was nationalized in 2012, production included 14,764 t of zinc in concentrate. The Government approved a performance-related bonus for workers at Colquiri in October 2013 that would provide an extra month's pay per year if EMC achieved its financial and production forecasts by yearend. It was reported that installation of a new concentration plant and microrefinery was approved in 2013 (Lonergan, 2013; ITRI Ltd., 2014a).

Tin.—Bolivia's state tin company Empresa Minera Huanuni (EMH) reported that it would increase tin concentrate production in 2014 to 3,000 t/mo owing to the construction of a new mill. Construction of the mill was 70% complete in October 2013. Once completed, the new plant could increase the estimated production capacity at Huanuni to between 13,000 and 14,000 t/yr of tin in concentrates. Production of tin metal at the Vinto smelter decreased slightly to 11,253 t compared with 11,350 t in 2012; production of tin metal by Operaciones Metalúrgicas S.A. increased to about 3,600 t compared with about 3,276 t in 2012. At the Colquiri Mine, production included 3,312 t of tin in concentrate. The amount of tin in concentrate produced at Colquiri was forecast to increase to about 8,000 t by 2025 (ITRI Ltd. 2013, 2014a, b).

In March 2014, Victory Mines Ltd. of Australia announced that it would acquire South American Tin Ltd. of Australia. At the same time, South American Tin was preparing for production at the San Pedrito Mine. The San Pedrito project involved South American Tin and the Juan del Valle Mining Cooperative's collaboration to establish a 150-metric-ton-per-day (t/d) processing plant to treat ore from the cooperative's existing underground mine plus surface stockpiles and tailings. When completed, the operation could produce about 300 t/yr of tin in concentrate (ITRI Ltd., 2014c; Victory Mines Ltd., 2014).

Tungsten.—On January 25, 2012, the Government nationalized the La Himalaya tungsten mine. The license to the mining concession had been held by Empresa Minera Barrosquira Ltda. (Embas) since 1995, but the mine had been operated by the Cerro Negro mining cooperative. In 2009, Empresa Minera Himalaya (EMH) and COMIBOL formed a joint venture and EMH invested $9 million in developing a 300-t/d operation. In 2013, EMH accused COMIBOL of breaching the law with statements relating to the Himalaya Mine indicating that COMIBOL intended to operate the mine without the participation of EMH (Beltrán, 2009; Williams, 2013).

Industrial Minerals

Lithium and Potash.—In 2013, COMIBOL completed the construction of a pilot plant for processing brines in the Salar de Uyuni. The pilot plant had a design capacity of 40 t/mo of lithium carbonate. There were no reports of marketable production of lithium in Bolivia during the year. In addition to the pilot lithium-carbonate plant, COMIBOL planned to develop a small-scale mine and construct a pilot plant that would have the capacity to produce about 12,000 t/yr of potash (potassium chloride) at the Salar de Uyuni. These projects were expected to be the first stage of work to eventually produce lithium carbonate and potash on a large scale by the end of 2015 (including proposed plans to construct new facilities with capacities to produce 30,000 t/yr of lithium carbonate and 700,000 t/yr of potash), as well as other minerals from the salar, such as boron and magnesium. The complex chemistry of the brines of the Salar de Uyuni as well as such environmental factors as higher rates of rainfall and lower rates of evaporation than in other salars led some analysts to project that producing lithium carbonate on a commercial scale from Salar de Uyuni could be more costly than producing it from other salars (Beltrán, 2011; Watts, 2011; Dyson, 2012; Demo-Dananberg, 2013b).

Mineral Fuels

Natural Gas and Petroleum.—In 2013, there were 57 active fields, with 41 operating contracts, where natural gas and hydrocarbon liquids (condensate, natural gas liquids, and crude petroleum) were produced in Bolivia. According to the Ministry of Hydrocarbons and Energy, the average daily production volume of marketed natural gas was about 56.4 million cubic meters per day and that volume was projected to increase to about 64.5 million cubic meters per day in 2014. Marketed production of natural gas had increased every year since 2009 when production was 34 million cubic meters per day. Production of natural gas liquids increased each year during the same period, averaging 11,790 barrels per day (bbl/d) in 2013 compared with 7,260 bbl/d in 2009. Condensate production on a daily basis also increased each year since 2009 to 4,260 bbl/d in 2013 from 2,816 bbl/d in 2009.

In 2013, 11 new exploratory wells were drilled compared with a total of 39 wells drilled between 2006 and 2013. Drilling of development wells increased steadily since 2007 when there was no activity. Development drilling primarily for petroleum took place at large fields, including the Margarita and the San Alberto fields, but also at smaller fields, including the Caranda, the Surubi, and the Tatarenda fields; the increase in development was a result of policies to increase production. Additional work in 2014 was expected to take place at 47 wells (Ministerio Hydrocarburos y Energía, 2014, p. 48–50, 53–54).

Outlook

Despite strong economic growth in 2013, Bolivia's mining sector appeared relatively stagnant as uncertainty regarding the passage of the country's proposed new mining law continued to hamper investment and exploration. There was no indication that the mine production would differ significantly in 2014 compared with that of 2013 given that there were no major capacity expansions planned to be completed or new operations expected to commence in 2014. The hydrocarbon sector was expected to continue its modest but steady growth.

In early 2014, a draft mining bill was submitted to Bolivia's Legislative Assembly. The main purpose of the bill was to migrate contracts signed by mining companies under the former concession-based model to new administrative mining contracts, the need for which came about owing to the 2009 Constitutional mandate that natural resources are the property of the Bolivian people. The proposed administrative mining model was intended to increase state oversight of the mining sector. If approved, the state will be authorized to oversee all mining activities and monitor investment and work plans for mines within the public or private sector as well as the mining collectives. This change, however, meant that more than 7,000 contracts would need to transition to the new model if the mining law is approved; these contracts could include major operations, including Sumitomo's San Cristobal Mine. The Ministry of Mines and its operational entity that is authorized to approve and sign contracts lack the capacity to inspect all former concessions and would be delegating the monitoring of the process to regional governments and municipalities. The new contract model will enable state mining companies to associate with Bolivian or foreign companies, as well as mining industry entities to set up associations. Legislative approval will be required to authorize joint ventures between COMIBOL or mining cooperatives and private sector entities. This requirement was introduced during the debate process in the House of Deputies and has been contested by mining cooperative representatives. It was thought to be unlikely that the Government would reverse its position regarding the legislative oversight because to do so would now be unconstitutional (IHS Inc., 2014).

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TABLE 1

BOLIVIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
METALS						
Antimony:						
Mine output, Sb content		2,990	4,980	3,947	5,088	5,081
Metal, smelter[3]		369	419	372	370 r	351
Trioxide, Sb content[3]		1,972	3,239	3,132	3,974 r	3,942
Arsenic trioxide[3]		115	155	99	103 r	120
Copper:						
Mine output, Cu content		882	2,063	4,176	4,976 r	7,549
Metal, primary		215	895	1,034	904 r	1,271
Gold:						
Mine output, Au content[4]	kilograms	7,217	6,394	6,513	7,047 r	6,751
Metal, including Au content of bullion and dore	do.	3,667	2,430	1,786	1,681 r	1,266
Lead:						
Mine output, Pb content		84,538	72,803	100,051	81,095 r	82,131
Metal, smelter, primary		418	310	269	250 e	330 e
Silver:						
Mine output, Ag content[5]	kilograms	1,325,729	1,259,388	1,213,586	1,205,804 r	1,287,200
Metal, including Ag content of bullion and dore	do.	33,000 e	225,211	258,756	185,571 r	187,559
Tantalum, tantalite, gross weight	do.	--	3,416	17,439	41,604	46,558
Tin:						
Mine output, Sn content		19,575	20,190	20,373	19,702	19,287
Metal, smelter		15,006	15,003	14,295	14,626 r	14,862
Tungsten, mine output, W content		1,023	1,204	1,124	1,573 r	1,580
Zinc, mine output, Zn content		430,879	411,409	427,129	389,911	407,331
INDUSTRIAL MINERALS						
Barite		2,069	7,845	21,297	19,725	20,000 e
Bentonite		323	440	591	745	525 e
Borax		1,124	485	221	200 e	200 e
Boric acid		11,114	12,619	13,742	14,892 r	14,985

See footnotes at end of table.

TABLE 1—Continued
BOLIVIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
INDUSTRIAL MINERALS—Continued						
Cement:						
Clinker	thousand metric tons	1,568	1,556	1,757	1,867	1,700 [e]
Hydraulic	do.	2,292	2,414	2,658	2,714	2,500 [e]
Gemstones, rough:						
Amethyst	kilograms	503,045	485,390	480,484	97,255	400,000 [e]
Ametrine (bolivianite)	do.	10	669	16,819	59	100 [e]
Gypsum, crude		1,931	556	698	594	600 [e]
Rock salt		1,947	1,218	1,968	2,461	2,000
Stone, natural:						
Granite		62	44	--	23 [r]	17
Limestone		26	111	195	200	200 [e]
Marble		32	65	40	265 [r]	27
Slate (pizarra)		190	63	104	141 [r]	112
Ulexite		85,530	97,303	135,068	127,638 [r]	149,818
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural:						
Gross	million cubic meters	13,411	15,227	16,437	18,706	18,247
Marketable (net)	do.	12,787	14,923	16,186	18,475	17,810
Natural gas liquids	thousand 42-gallon barrels	2,650 [r]	3,055 [r]	3,310 [r]	3,931 [r]	4,303
Petroleum:						
Crude	do.	12,329	12,607	12,958	15,086	15,177
Refinery products:						
Liquefied petroleum gas	do.	297 [r]	289 [r]	283 [r]	282 [r]	361
Gasoline:						
Aviation	do.	14	4	28	45 [r]	41
Motor	do.	5,362	5,489	5,429	5,924 [r]	6,707
Jet fuel	do.	1,046	1,096	1,182	1,052 [r]	1,301
Kerosene	do.	125	127	128	121 [r]	107
Distillate fuel oil, including diesel fuel oil	do.	4,053	4,035	4,275	4,590 [r]	5,192
Lubricants:						
Oil, including automotive and industrial	do.	140	144	149	156 [r]	165
Greases[6]	do.	2	3	3	3	3
Asphalt[6]	do.	15	12	11	12	12
Total	do.	11,054 [r]	11,199 [r]	11,488 [r]	12,185 [r]	13,889

[e] Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r] Revised. do. Ditto. -- Zero.

[1] Table includes data available through August 6, 2014.

[2] In addition to the commodities listed, bismuth, indium, iron ore, manganese and a variety of industrial minerals (clays, crushed and broken stone, dimension stone, lime, sand and gravel, native sulfur, and quartz) were produced, but available information is inadequate to make reliable estimates of output.

[3] Exported production.

[4] May include production of metallic gold.

[5] May include production of metallic silver.

[6] Reported figures were converted from metric tons to equivalent barrels.

TABLE 2
BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Antimony		Empresa Minera Unificada S.A. (EMUSA) (private, 100%)	Caracota, Chilcobija, and Espiritu Santo Mines, Potosi Department	1,100
Do.		Small-scale mining operations and cooperatives (private, 100%)	San Jose Mine, Oruro Department; mines in Caracota District, Nor Chichas, Quijarro, and Sud Chichas Provinces, Potosi Department	4,500
Do.		Shrewton Investments Ltd., 70%, and Raptor Ventures LLC (Planet Resource Recovery Inc., 100%), 30%	San Antonio de Turiri Mine, Potosi Department	NA
Antimony, metal (regulus)		Empresa Metalúrgica Vinto (Government, 100%)	Vinto antimony plant, Carretera Vinto, Oruro Department	6,000
Antimony, metal		Operaciones Metalúrgicas S.A. (OMSA)	Huajara Industrial Park, east of Oruro, Oruro Department	3,000
Do.		Fundestaño de Oruro S.A. (Empresa Minera Unificada S.A., 100%)	City of Oruro, Oruro Department	1,100
Antimony trioxide		Empresa Minera Bernal Hermanos S.A. (private, 100%)	Palala smelter, Tupiza, Potosi Department	1,900
Bismuth		Cooperativa Minera Locatarios Tasna Ltda.	Tasna Mine, near Oruro, Oruro Department	200
Bismuth, refined		Corporación Minera de Bolivia (COMIBOL) (Government, 100%)	Telamayu bismuth refinery, Telamayu, Potosi Department	350
Do.		Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, Carretera Vinto, Oruro Department	90
Cement	thousand metric tons	Sociedad Boliviana de Cemento S.A. (SOBOCE) (Consorcio Cementero del Sur S.A., 47.02%, and other private, 52.98%)	El Puente (near Tarija), EMISA (near Oruro), VIACHA (near La Paz), and WARNES (near Santa Cruz) plants	1,800
Do.	do.	Fábrica Nacional de Cemento S.A. (Chuquisaca Provincial Government, 33.34%; Municipal Government of Sucre, 33.33%; Universidad San Francisco Xavier de Chuquisaca, 33.33%)	Cal Orcko industrial complex near Sucre, including grinding plant, and FANCESA cement plant near Chuquisaca	1,100
Do.	do.	Cooperativa Boliviana de Cemento Ltda. (COBOCE)	Irpa Irpa plant, near Cochabamba	825
Do.	do.	ITACAMBA Cemento S.A.	Plant, Santa Cruz Department	180
Copper		Pan American Silver Corp., 95%, and Trafigura Baheer B.V., 5%	San Vicente Mine, Potosi Department	350
Do.		Corporación Minera de Bolivia (COMIBOL) (Government, 55%, and Korea Resources Corp., 45%)	Coro Coro Mine, La Paz Department	3,600
Do.		Small-scale mining operations and cooperatives (private, 100%)	Mining operations in Chuquisaca, La Paz, Oruro, and Potosi Departments	650
Gemstones, ametrine		Minerales y Metales del Oriente S.R.L.	Anahi Mine, Santa Cruz Department	NA
Gold	kilograms	Empresa Minera Paititi S.A. {Orvana Minerals Corp. [Fabulosa Mines Ltd. (Minera S.A., 100%), 52.5%, and other private, 47.5%], 100%}	Don Mario Mine, Chiquitos Province, Santa Cruz Department	2,100
Do.	do.	Golden Eagle International Inc. (private, 100%)	Cangalli Mine, Santa Cruz Department	150
Do.	do.	Grupo Minero La Roca S.A. (private, 100%)	La Paz Department	200
Do.	do.	Mining cooperatives (private, 100%)	Tipuani, Guanay, Mapiri, Huayta, Kaka, and Teoponte Rivers, La Paz Department	4,350
Gold-silver dore, bullion, Ag content	do.	Empresa Minera Inti Raymi S.A. (Compañia Procesadora de Minerales S.A., 88%, and Empresa Minera Unificada S.A., 12%)	Kori Chaca open pit mine and Kori Kollo leaching plant, near Oruro	4,100
Indium, run of mine		Corporación Minera de Bolivia (Government, 100%), 50%, and Sinchi Wayra S.A. (Glencore Xstrata plc, 100%), 50%	Bolivar Mine, Potosi Department	35
Do.		Sinchi Wayra S.A. (Glencore Xstrata plc, 100%)	Colquechaquita-San Lorenzo and Porco Mines, Potosi Department	35
Do.		Pan American Silver Corp., 95%, and Trafigura Baheer B.V., 5%	San Vicente Mine, Potosi Department	15
Do.		Empresa Minera Colquiri [Corporación Minera de Bolivia (Government, 100%), 100%]	Colquiri tin and zinc mine, Inquisivi Province, La Paz Department	5

See footnotes at end of table.

TABLE 2—Continued
BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity^e
Lead		Corporación Minera de Bolivia, 50%, and Sinchi Wayra S.A., 50%	Bolivar Mine, Potosi Department	15,000
Do.		Empresa Minera San Cristóbal S.A. (Sumitomo Corp., 100%)	San Cristobal Mine, southwestern Bolivia	82,000
Do.		Corporación Minera de Bolivia, 100%	Cerro Rico Mine, Potosi Department, and in areas immediately surrounding the San Cristobal Mine	10,200
Do.		Sinchi Wayra S.A. (Glencore Xstrata plc, 100%)	Caballo Blanco group of mines (Colquechaquita-San Lorenzo, Reserva, and Tres Amigos Mines), and Porco Mine, Potosi Department; and Poópo Mine, Oruro Department	15,000
Do.		Empresa Minera La Solución Ltda.	Asientos and Monserrate lead, silver, and zinc mines, Cochabamba Department	610
Do.		Empresa Minera Santa Lucia Ltda.	Santa Lucia lead-silver-zinc mine, Potosi Department	200
Lead, metal		Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, Carretera Vinto, Oruro Department	120
Do.		Empresa Metalúrgica de Karachipampa (Corporación Minera de Bolivia, 100%)	Karachipampa lead and silver smelter and zinc refinery, Potosi Department	30,000
Natural gas	million cubic meters	Operated by Empresa Petrolera Andina S.A. (YPFB Andina S.A. [Government, 100%], 51.08%, and Repsol YPF, S.A., 48.92%) and owned by Empresa Petrolera Andina, S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	Los Sauces, Rio Grande, Sirari, Vibora, and Yapacani fields, Santa Cruz Department	2,700
Do.	do.	Operated by Petróleo Brasileiro S.A. (Petrobras) (Brazilian Government, 32.2%; private, 67.8%), and owned by Empresa Petrolera Andina S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	Sabalo field, San Antonio Block; San Alberto field and Block, Tarija Department	7,200
Do.	do.	Operated by Petróleo Brasileiro S.A. (Petrobras) (Brazilian Government, 32.2%; private, 67.8%), and operation license owned by Total S.A., 41%; Petróleo Brasileiro S.A., 30%; BG Group plc., 25%; YPFB Chaco S.A., 4%	Itaú field, Block XX Tarija Oeste, Tarija Department	NA
Do.	do.	Operated and owned by YPFB Chaco S.A. (Government, 100%)	Vuelta Grande field, Chuquisaca Department; Bulo Bulo, Carrasco, and Kanata fields, on the border of Cochabamba and Santa Cruz Departments	2,200
Do.	do.	Operated by Repsol YPF, S.A., and owned by BG Group plc., 37.5%, Repsol YPF S.A., 37.5%; Pan American Energy LLC (BP p.l.c., 60%; BRIDAS Corp., 40%), 25%	Margarita field, Caipipendi Block, Tarija Department; Paloma field, Mamore Block, Cochabamba and Santa Cruz Departments	1,300
Do.	do.	Operated and owned by BG Group plc., 100%	La Vertiente, Escondido, and Taiguati fields, La Vertiente Block; Los Suris field and Block, all in Tarija Department	630
Do.	do.	Operated by Pluspetrol Bolivia Corporation S.A. (owned by Pluspetrol S.A., 100%)	Bermejo and Madrejones fields, Tarija Department; Tacobo field, Santa Cruz Department	520
Do.	do.	Operated by Vintage Petroleum Boliviana Ltda. (owned by Occidental Petroleum Corp., 100%)	Chaco Sur and Ñupuco fields, Tarija Department; Naranjillos field, Santa Cruz Department	350
Petroleum	thousand 42-gallon barrels	Operated by Empresa Petrolera Andina S.A. (YPFB Andina S.A. [Government, 100%], 51.08%; Repsol YPF, S.A., 48.92%) and owned by Empresa Petrolera Andina, S.A., 50%, Petróleo Brasileiro S.A., 35%; Total S.A., 15%	Los Sauces, Rio Grande, Sirari, Vibora, and Yapacani fields, Santa Cruz Department	2,100
Do.	do.	Operated by Petróleo Brasileiro S.A. (Petrobras) (Brazilian Government, 32.2%; private, 67.8%), and owned by Empresa Petrolera Andina S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	Sabalo field, San Antonio Block; San Alberto field and Block, Tarija Department	7,500

See footnotes at end of table.

TABLE 2—Continued
BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Petroleum—Continued	thousand 42-gallon barrels	Operated and owned by YPFB Chaco S.A. (Government, 100%)	Vuelta Grande field, Chuquisaca Department; Bulo Bulo, Carrasco, and Kanata fields, on the border of Cochabamba and Santa Cruz Departments	2,900
Do.	do.	Operated by Repsol YPF, S.A., and owned by BG Group plc., 37.5%; Repsol YPF S.A., 37.5%; Pan American Energy LLC (BP p.l.c., 60%; BRIDAS Corp., 40%), 25%	Margarita field, Caipipendi Block, Tarija Department; Paloma field, Mamore Block, Cochabamba and Santa Cruz Departments	5,000
Do.	do.	Operated and owned by BG Group plc., 100%	La Vertiente, Escondido, and Taiguati fields, La Vertiente Block; Los Suris field and Block, all in Tarija Department	610
Do.	do.	Operated by Pluspetrol Bolivia Corporation S.A. (Pluspetrol S.A., 100%)	Bermejo and Madrejones fields, Tarija Department; Tacobo field, Santa Cruz Department	160
Do.	do.	Operated by Vintage Petroleum Boliviana Ltda. (Occidental Petroleum Corp., 100%)	Chaco Sur and Ñupuco fields, Tarija Department; Naranjillos field, Santa Cruz Department	140
Silver	kilograms	Empresa Minera San Cristóbal S.A. (Sumitomo Corp., 100%)	San Cristobal Mine, southwestern Bolivia	526,000
Do.	do.	Empresa Minera Manquiri S.A. (Coeur d'Alene Mines Corp., 100%)	San Bartolome Mine, by Cerro Rico, near Potosi, Potosi Department	280,000
Do.	do.	Small-scale mining operations and cooperatives (private, 100%)	Candelaria and other mines, Cerro Rico deposit, as well as in areas immediately surrounding the San Bartolome Mine (under construction), Oruro and Potosi Departments	280,000
Do.	do.	Sinchi Wayra S.A., 50%, and Corporacion Minera de Bolivia (COMIBOL), 50%	Caballo Blanco group of mines (Colquechaquita-San Lorenzo, Reserva, and Tres Amigos Mines), and Porco Mine, Potosi Department; and Poópo Mine, Oruro Department	180,000
Do.	do.	Empresa Minera Santa Lucia Ltda.	Santa Lucia lead, silver, and zinc mine, Potosi Department	30,000
Do.	do.	Empresa Minera Paititi S.A. {Orvana Minerals Corp. [Fabulosa Mines Ltd. (Minera S.A., 100%), 52.5%, and other private, 47.5%], 100%}	Don Mario Mine, Chiquitos Province, Santa Cruz Department	7,500
Do.	do.	Empresa Minera La Solución Ltda.	Asientos and Monserrate lead, silver, and zinc mines, Cochabamba Department	2,000
Do.		Corporación Minera de Bolivia (Government, 100%), 50%; and Sinchi Wayra S.A. (Glencore Xstrata plc, 100%), 50%	Bolivar Mine, Potosi Department	NA
Do.		Empresa Minera Huanuni [Corporación Minera de Bolivia (Government, 100%), 100%]	Cerro Rico Mine, Potosi Department	NA
Silver, metal		Empresa Metalúrgica de Karachipampa (Corporación Minera de Bolivia, 100%)	Karachipampa lead and silver smelter and zinc refinery, Potosi Department	310
Do.		Empresa Minera Manquiri S.A. (Coeur d'Alene Mines Corp., 100%)	San Bartolome Mine and plant, by Cerro Rico, near Potosi, Potosi Department	NA
Do.		Pan American Silver Corp., 95%, and Trafigura Baheer B.V., 5%	San Vicente Mine, Potosi Department	130
Do.		Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, Carretera Vinto, Oruro Department	2
Tin		Empresa Minera Huanuni [Corporación Minera de Bolivia (Government, 100%), 100%]	Huanuni Mine, Dalence Province, Oruro Department	10,000
Do.		Empresa Minera Colquiri [Corporación Minera de Bolivia (Government, 100%), 100%]	Colquiri tin and zinc mine, Inquisivi Province, La Paz Department	6,000
Do.		Empresa Minera Barrosquira Ltda. (private, 100%)	Caracoles Mine, Inquisivi Province, La Paz Department	500

See footnotes at end of table.

TABLE 2—Continued

BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Tin—Continued	Small-scale mining operations and cooperatives (private, 100%)	Caracoles, Huanuni, Viloco, and other current or former Corporación Minera de Bolivia mines, in Oruro, Potosi, and La Paz Departments	10,000
Tin, refined	Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, Carretera Vinto, Oruro Department	12,000
Do.	Operaciones Metalúrgicas S.A. (OMSA)	Huajara Industrial Park, east of Oruro, Oruro Department	3,360
Tin-lead alloys	Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, Carretera Vinto, Oruro Department	200
Tungsten, W content	Empresa Minera Himalaya [Corporación Minera de Bolivia (Government, 100%), 100%]	Himalaya Mine, Murillo Province, La Paz Department	NA
Do.	Small-scale mining operations and cooperatives (private, 100%)	Bolsa Negra, Enramada, Reconquistada Mines, near the former International Mining Co.'s Chojilla Mine, Sud Yungas Province; Chambilaya and Chicote Grande Mines, Inquisivi Province; Mercedes, San Antonio, Ucumarini Mines, Larecaja Province, La Paz Department	1,200
Zinc	Empresa Minera San Cristóbal S.A. (Sumitomo Corp., 100%)	San Cristobal Mine, southwestern Bolivia	270,000
Do.	Sinchi Wayra S.A., 50%, and Corporacion Minera de Bolivia (COMIBOL), 50%	Caballo Blanco group of mines (Colquechaquita-San Lorenzo, Reserva, and Tres Amigos Mines), and Porco Mine, Potosi Department; and Poópo Mine, Oruro Department	205,000
Do.	Corporación Minera de Bolivia, 100%	Cerro Rico Mine, Potosi Department, and in areas immediately surrounding the San Cristobal Mine	85,000
Do.	Empresa Minera Colquiri [Corporación Minera de Bolivia (Government, 100%), 100%]	Colquiri tin and zinc mine, Inquisivi Province, La Paz Department	14,000
Do.	Empresa Minera Santa Lucia Ltda.	Santa Lucia lead, silver, and zinc mine, Potosi Department	12,000
Do.	Pan American Silver Corp., 95%, and Trafigura Baheer B.V., 5%	San Vicente Mine, Potosi Department	6,000
Do.	Empresa Minera La Solución Ltda.	Asientos and Monserrate lead, silver, and zinc mines, Cochabamba Department	1,300
Do.	Corporación Minera de Bolivia, 50%, and Sinchi Wayra S.A., 50%	Bolivar Mine, Potosi Department	NA
Zinc, refined	Empresa Metalúrgica de Karachipampa (Corporación Minera de Bolivia, 100%)	Karachipampa lead and silver smelter and zinc refinery, Potosi Department	70,000

[e] Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

THE MINERAL INDUSTRY OF BRAZIL

By Yadira Soto-Viruet

In 2013, Brazil was estimated to be the world's leading producer of niobium (accounting for 90% of world production), the third-ranked producer of asbestos and vermiculite (accounting for 15% of world production each) and iron ore (accounting for 10% of world production), the fourth-ranked producer of bauxite (accounting for 11% of world production) and tantalum (accounting for 12% of world production), the fifth-ranked producer of manganese (accounting for 6% of world production), and the seventh-ranked producer of nickel (accounting for 5% of world production). According to the Instituto Aço Brasil, the country was the ninth-ranked producer of crude steel in the world, accounting for about 2% of the world's production, and the leading producer in Latin America, accounting for about 52% of Latin America's production (Instituto Aço Brasil, 2014, p. 14–15; Bray, 2015b; Corathers, 2015; Kuck, 2015; Papp, 2015a, b; Tanner, 2015; Tuck, 2015; Virta, 2015).

According to the World Bank Group, in 2013, Brazil was the seventh-ranked economy in the world based on gross domestic product (GDP) (purchasing power parity). In 2013, Brazil's real GDP was about $2.05 trillion[1] compared with a revised $2.31 trillion in 2012. The mining and mineral-processing industries contributed 4.1% of the GDP in 2013 compared with 4.3% in 2012. According to the Instituto Brasileiro de Mineração (IBRAM), mineral exports accounted for about 17% of the country's exports. Brazil's leading mineral exports were, in order of value, iron ore, gold, niobium, and copper. Its leading mineral imports were coal, potassium, and copper (Departamento Nacional de Produção Mineral, 2013, p. 2; 2014b, p. 3, Instituto Brasileiro de Mineração, 2015b, p. 2; Banco Central do Brasil, 2015; World Bank Group, The, 2015).

According to the U.S. Energy Information Administration, Brazil was ranked 10th among the world's leading producers of oil, 10th among the world's leading energy producers, and 8th among the world's energy consumers. Government-owned Petróleo Brasileiro S.A. (Petrobras) was the leading participant in Brazil's petroleum sector, holding important positions in upstream, midstream, and downstream operations. In 2013, Petrobras continued to operate in an integrated fashion by engaging in exploration and production, refining, crude oil and natural gas trade and transportation, petrochemicals and derivatives, electrical energy, and biofuel and other renewable energy source distribution. Petrobras had a presence in 17 countries (Petróleo Brasileiro S.A., 2014b, p. 2; U.S. Energy Information Administration, 2014a, b).

Brazil's proven oil reserves (onshore and offshore) were estimated to be 15.6 billion barrels (Gbbl) and natural gas reserves were estimated to be 458 billion cubic meters, which ranked the country second in reserves in South America after Venezuela. About 94% of the total proven oil reserves and 85% of the total proven natural gas reserves were located offshore. In 2013, massive pre-salt areas discovered in the country accounted for 15% of the total oil production. The pre-salt area measured about 800 kilometers (km) in length and 200 km in width and was located off the coast between the States of Santa Catarina and Espirito Santo (table 3; National Agency of Petroleum, Natural Gas and Biofuels, 2014, p. 31–33; U.S. Energy Information Administration, 2014a; Petróleo Brasileiro S.A., 2015b).

Minerals in the National Economy

Brazil's mineral sector included industrial minerals, metals, and mineral fuels, as well as biofuels and ethanol. Of the 51 mineral commodities surveyed by the Departamento Nacional de Produção Mineral (DNPM), mineral production decreased for 17 commodities, including production of potassium, which decreased about 10%; aluminum, 9%; and iron ore, 4%. According to the IBRAM, Brazil's mineral production in 2013 was valued at $44 billion compared with $48 billion (revised) in 2012. In 2013, 229,145 workers were employed in the mining industry compared with 223,997 in 2012. Employment in the mining industry accounted for about 0.6% of the total workforce in the country in 2013. Employment in the extraction of coal increased by 5.6% to 5,365 workers in 2013 compared with 5,082 in 2012; followed by clay, sand, and stone, which increased by 3% to 73,546 workers compared with 71,598 in 2012; and iron ore, which increased by 1% to 52,568 workers compared with 52,061 in 2012. Employment in the extraction of nonferrous metallic minerals decreased by 2% to 33,715 workers compared with 34,373 workers in 2012 (Departamento Nacional de Produção Mineral, 2014b, p. 3, 20–21; Instituto Brasileiro de Mineração, 2015a).

According to the DNPM and Ministério de Minas e Energia (MME), in 2013, exploration permits (autorizações de pesquisa) increased by 53% to 13,562 compared with 8,860 in 2012; however, mining concession titles (Concessões de Lavra) decreased by about 46% to 177 compared with 331 in 2012, and small-scale mining permits (Permissões de Lavra Garimpeira) decreased by 33% to 212 compared with 316 in 2012 (Departamento Nacional de Produção Mineral, 2014a, p. 10).

Investment prospects in Brazil's mineral sector were compiled for a 5-year period by IBRAM. Planned investments during 2013 through 2017 amounted to about $64 billion, which represented a decrease of about 15% compared with the period 2012 through 2016, which amounted to about $75 billion. Investors continued to wait for the legal and regulatory definitions of the proposed new regulatory framework for mining, which was submitted to the Brazilian Congress in 2013, to validate planned investments (Instituto Brasileiro de Mineração, 2014, p. 25).

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[1] Where necessary, values have been converted from Brazilian reals (BRL) to U.S. dollars (US$) at an average rate of BRL2.04=US$1.00 for 2012 and BRL2.86=US$1.00 for 2013.

Government Policies and Programs

The Mining Code [Decree-law (Act) No. 227 of February 28, 1967] governs all aspects of the mineral industry, from exploration to production and use of mineral resources, and establishes the rights and duties of the holders of mining rights. The DNPM, which is part of the MME, has the responsibility for managing the country's mineral resources, for the inspection of the mineral activity in the country, and for enforcing the Mining Code and implementing its legal provisions. Decree-law (Act) No. 227 was amended by law No. 9314 of November 14, 1996, to provide greater flexibility for investment in the Brazilian mining sector. Article 7 of the Mining Code of 1967 stipulates that the production of minerals will depend upon the exploration authorization permit granted by the General Director of the DNPM and the development concession issued by the Minister of the MME. Licensing is a restricted system applicable exclusively to the production of industrial minerals. A draft bill for a new regulatory framework for mining (PL No. 5807/13) was under revision in 2013. The proposed regulatory framework, which would modify the Mining Code, included the creation of the Conselho Nacional de Política Mineral (National Mineral Policy Council) and the Agência Nacional de Mineração (National Agency of Mining), and an increase in royalties on minerals (Instituto Brasileiro de Mineração, 2013a, p. 23; Departamento Nacional de Produção Mineral, 2015a).

The MME's Companhia de Pesquisa de Recursos Minerais (CPRM) (Geological Survey of Brazil) is responsible for geologic, geophysical, geochemical, hydrologic, and hydrogeologic mapping and the dissemination and management of geologic and hydrological information. The Agência Nacional do Petróleo, Gás Natural e Biocombustíveis (ANP, National Agency of Petroleum, Natural Gas and Biofuels), which is part of the MME, has the responsibility for regulating activities that integrate the oil, natural gas, and biofuels industries in the country and for issuing exploration and production licenses (Ministério de Minas e Energia, 2015a, b).

In 2010, the Government passed legislation instituting a new regulatory framework for the country's pre-salt reserves. The framework authorized the creation of Government-owned Pre-Sal Petroleo S.A. (PPSA), which was established by Decree No. 8.063 of August 1, 2013, and allowed the Government to capitalize Petrobras by granting the company 5 Gbbl of unlicensed pre-salt oil reserves in exchange for a larger ownership share. PPSA is responsible for managing new pre-salt production and trading contracts in the oil and gas industry. The framework also established a new development fund to manage Government revenues from pre-salt oil and laid out a new production-sharing agreement (PSA) system for pre-salt reserves. Petrobras is to be the sole operator of each PSA and is to hold a minimum 30% stake in all pre-salt projects (U.S. Energy Information Administration, 2014b; Ministério de Minas e Energia, 2015c).

Brazil's mining royalties are collected by Compensação Financeira pela Exploração de Recursos Minerais (Financial Compensation for Exploiting Mineral Resources, CFEM), which is part of the DNPM. The prevailing royalty rates are 3% for bauxite, manganese ore, potassium, and rock salt; 2% for coal, fertilizers, iron ore, and other minerals; 1% for gold; and 0.2% for other precious minerals and precious stones. The collected royalties are allocated among the municipalities (65%), States (23%), and the Federal Government (12%), of which the DNPM receives 9.8% (Instituto Brasileiro de Mineração, 2013a, p. 9; Departamento Nacional de Produção Mineral, 2015b).

Brazil continued to be a member of the Mercado Común del Cono Sur (MERCOSUR), which is a trade association that promotes free trade; member countries include Argentina, Bolivia, Brazil, Paraguay, Uruguay, and Venezuela. In 2013, MERCOSUR received about 12% of Brazil's exports and supplied about 8% of Brazil's imports. The country also continued to participate in the BRICS (Brazil, Russia, India, China, and South Africa) economic forum, whose member countries, combined, represented a significant share of the world's GDP and population (Mercado Común del Cono Sur, 2015; Ministry of External Relations, 2015).

Production

In 2013, Brazil's monazite concentrate production increased by 191% to 600 metric tons (t) from 206 t in 2012; columbite and tantalite production increased by 57% to 185 t from 118 t in 2012; vermiculite, by 31% to 68,014 t from 51,986 t; tungsten content of mine output, by 30% to 494 t from 381 t; primary refined copper, by 26% to 234,150 t from 186,000 t; beneficiated diatomite, by 25% to 2,475 t from 1,987 t; and crude talc and pyrophyllite, by 24% to 737,950 t from 593,140 t (revised). Tin content of mine output increased by 23% to 16,830 t in 2013 from 13,667 t in 2012; primary smelter tin, by 23% to 14,721 t from 11,955 t; mine output of cobalt, by 21% to 3,500 t from 2,900 t; copper content of mine output, by 21% to 270,979 t from 223,141 t; beneficiated feldspar, by 19% to 294,357 t from 247,152 t; and mine output of gold, by 19% to 79,573 kilograms (kg) from 66,773 kg. Other notable production increases included acid-grade fluorspar and metallurgy sulfur, which increased by 18% each; beneficiated magnesite, by 16%; lead content of mine output, by 15%; ferrochromium, ferronickel, and metallurgical-grade fluorspar, by 14% each; ilmenite concentrate, lithium concentrate, and run-of-mine bituminous coal, by 13% each; secondary refined copper, by 12%; beneficiated bituminous coal, by 12%; and nickel content in ferronickel, by 10%. Production of crude barite decreased by 81% to 34,943 t in 2013 from 186,134 t in 2012; quartz, by 34% to 10,696 t from 16,254 t; nickel content in ore, by 25% to 104,829 t from 139,230 t; crude diatomite, by 43% to 1,947 t from 3,427 t; nickel content in matte, by 19% to 11,641 t from 14,345 t; beneficiated bentonite, by 15% to 434,000 t from 512,975 t; and mine output of nickel ore, by 12% to 13.0 million metric tons (Mt) from 14.7 Mt. Production of crude magnesite decreased by 12%; crude gypsum and anhydrite, by 11%; and potash, potassium, and pyrochlore concentrate (Nb_2O_5 content), by 10% each. Data on mineral production are in table 1.

Structure of the Mineral Industry

In 2013, bauxite was produced by Alcoa Aluminio S.A., Alcoa World Alumina Brasil Ltda. (AWAB), Companhia

Brasileira de Alumínio S.A. (CBA), Mineração Paragominas S.A., and Mineração Rio do Norte S.A. (MRN). MRN, which is located in Porto Trombetas in the State of Para, had the capacity to produce 18.1 million metric tons per year (Mt/yr) of bauxite.

According to the Sindicato Nacional da Indústria do Cimento, the country had about 88 cement plants. On January 31, Cimentos de Portugal, SGPS, S.A. of Portugal (Cimpor) announced the merger of Cimpor Cimentos do Brasil S.A. and InterCement Brasil S.A., both owned by Camargo Correa S.A. through its subsidiary Cimpor. After the merger, InterCement was the operator of 16 cement plants located in the States of Alagoas, Bahia, Goias, Mato Grosso do Sul, Minas Gerais, Paraiba, Pernambuco, Rio Grande do Sul, and Sao Paulo. InterCement had the capacity to produce about 17.9 Mt/yr of cement. Cement was also produced by Companhia de Cimento Itambé, Cimento Nacional, Cimento Nassau, Cimento Planalto S.A., Cimento Tupi S.A., Holcim (Brasil) S.A., Lafarge Brasil S.A., Mizu Cimentos Especiais, and Votorantim Cimentos S.A. (Cimentos de Portugal, SGPS, S.A., 2013; Sindicato Nacional da Indústria do Cimento, 2014b, p. 7). Table 2 is a list of major mineral industry facilities.

Caraíba Metais S/A, which was located in the State of Bahia, was the only electrolytic copper producer in the country and had a production capacity of about 280,000 metric tons per year (t/yr). Votorantim, which was the only producer of zinc in the country, owned two mines (Vazante and Morro Agudo) and two metallurgy operations (Juiz de Fora and Tres Marias) located in the State of Minas Gerais. The Juiz de Fora and Tres Marias operations had production capacities of about 95,000 t/yr and 180,000 t/yr of zinc, respectively. Eternit Group, through its subsidiary Sociedade Anônima Mineração de Amianto S.A. (SAMA), owned Cana Brava, which was the only asbestos operation in the country. Cana Brava is located in Minacu in the State of Goias and had the capacity to produce about 300,000 t/yr of concentrates. According to the DNPM, Cana Brava was expected to produce an average of about 284,000 t/yr between 2014 and 2016. Petrobras operated refineries located in the States of Amazonas, Bahia, Ceara, Minas Gerais, Parana, Rio de Janeiro, Rio Grande do Sul, and Sao Paulo with the combined capacity of about 804 million barrels per year (Departamento Nacional de Produção Mineral, 2014b, p. 59).

Mineral Trade

In 2013, the total value of Brazil's exports was about $242.0 billion compared with about $242.6 billion in 2012. The total value of Brazil's imports in 2013 was about $239.7 billion compared with about $223.2 billion in 2012. The country's major export trade partners were, in descending order of value, China, which received 19% of Brazil's exports, the United States (10%), Argentina (8%), and the Netherlands (7%). Its major import partners were, in descending order of value, China, which supplied 16% of Brazil's imports, the United States (15%), Africa and Argentina (7%, each), and Germany (6%). In 2013, mineral exports were valued at about $41.2 billion compared with about $39.3 billion in 2012 and imports, about $8.7 billion compared with about $9.2 billion in 2012. The mineral trade surplus was about $32.5 billion in 2013 compared with $30.1 billion (revised) in 2012. Iron ore accounted for about 79% of the mineral exports, followed by gold (6%), copper (4%), and ferroniobium (4%). Potassium accounted for about 39% of the primary minerals imports, followed by coal (34%), copper (12%), and sulfur (3%). According to the Associação Brasileira do Alumínio (ABAL), in 2013, exports of aluminum totaled 530,400 t compared with a revised 646,400 t in 2012. The country's imports of aluminum totaled 332,900 t compared with a revised 331,300 t in 2012 (Associação Brasileira do Alumínio, 2014a, b, d; Banco Central do Brasil, 2015; Instituto Brasileiro de Mineração, 2015b).

Brazil's exports of crude oil totaled about 139 million barrels (Mbbl) in 2013 compared with 200 Mbbl in 2012. Its major exports partners were, in descending order of volume, China, which received 30% of Brazil's crude oil exports), the United States (28%), India (13%), and Chile (8%). The country's crude oil imports increased to 148 Mbbl in 2013 from 114 Mbbl in 2012. The leading import sources were Nigeria (53%), Saudi Arabia (19%), and Algeria (8%). In 2013, imports of natural gas and liquefied natural gas (LNG) totaled about 17 million cubic meters compared with 13 million cubic meters in 2012. Bolivia supplied 70% of Brazil's natural gas imports and Trinidad and Tobago supplied about 45% of the country's LNG imports (National Agency of Petroleum, Natural Gas and Biofuels, 2014, p. 48, 56).

Brazil's exports to the United States were valued at about $27.6 billion in 2013 compared with about $32.1 billion in 2012. Crude oil accounted for $4.2 billion of exports; iron and steel mill products, about $2.0 billion; fuel oil, about $1.3 billion; coal and related fuels, about $940 million; petroleum products, about $820 million; and bauxite and aluminum, about $179 million. Imports from the United States were valued at $44.1 billion in 2013 compared with $43.8 billion in 2012; these included nearly $3.1 billion in fuel oil, $2.2 billion in petroleum products, $946 million in metallurgical-grade coal, $683 million in natural gas liquids, and $642 million in excavating machinery (U.S. Census Bureau, 2014a, b).

Commodity Review

Metals

Aluminum and Bauxite and Alumina.—In 2013, the country was estimated to rank eighth among the world's leading aluminum producers. Alumina production increased by 2% to about 10.5 Mt in 2013 compared with 10.3 Mt (revised) in 2012. Exports of alumina totaled about 7.1 Mt in 2013 compared with more than 7.3 Mt in 2012. Primary aluminum production decreased by 9% to about 1.3 Mt from about 1.4 Mt in 2012. Bauxite production was about 33 Mt, which was about the same level as that of 2012. The State of Para continued to be the leading State producer of bauxite and accounted for about 90% (29 Mt) of the nation's production in 2013. Bauxite exports totaled about 8.4 Mt compared with 6.9 Mt in 2012. According to the ABAL, Brazil's consumption of aluminum products by end use was as follows: packaging (which accounted for 29.5% of aluminum consumption), transportation (20.4%), electrical (10.4%), construction (16.2%), consumer durables (10.1%), machinery (4.4%), and others (9.0%). In 2013, the leading aluminum producers were Alumínio Brasileiro S.A., which produced about 35% of Brazil's primary aluminum, followed by CBA (32%) and Consorcio de Alumínio do Maranhão (26%) (Associação Brasileira do Alumínio, 2014c, 2015; Bray, 2015a; Departamento Nacional de Produção Mineral, 2014b, 30–31).

In January, Votorantim, through its subsidiary Votorantim Metais, announced that it would invest about $2.9 billion in the development of the Alumina Rondon project, which was located in Rondon do Para in the State of Para. The project would include a bauxite mine and an alumina refinery with the capacity to produce more than 7.7 Mt/yr of bauxite and 3 Mt/yr of alumina. The company submitted its environmental impact study (EIS) for Alumina Rondon in 2012. Votorantim reported that the project was at the stage of obtaining an environmental license and was expected to begin operations by 2017; however, the startup date of operations would depend on the approval of the environmental license (Votorantim Group, 2013a, b; 2014, p. 119; Departamento Nacional de Produção Mineral, 2014b, p. 30–31).

Copper.—In 2013, the leading State for copper concentrate production was Para, which accounted for about 68% of the nation's total, followed by the States of Goias (24%) and Bahia (8%).

In 2013, Brazil exported 242,750 t of metal content in concentrates compared with 157,650 t in 2012 and imported 152,292 t of metal content in concentrates compared with 76,072 t in 2012. In 2013, exports and imports of metal (primary and secondary) were 118,700 t and 280,600 t, respectively. Caraíba Metais S.A. (a subsidiary of Paranapanema S.A.) accounted for about 95% of Brazil's refined copper production. The refinery had the capacity to produce about 280,000 t/yr of refined copper and was located in Camacari in the State of Bahia (Departamento Nacional de Produção Mineral, 2014b, p. 56).

Vale produced copper concentrates at its Salobo and Sossego open pit mines located in Carajas in the State of Para. In 2013, the Sossego Mine produced about 119,000 t of copper compared with 110,000 t in 2012, and the Salobo Mine, which began operation in 2012, produced about 65,000 t of copper compared with 13,000 t in 2012. In 2013, total proven and probable reserves at Sossego were reported as about 137.5 Mt at an average grade of 0.77% copper compared with 150.7 Mt at an average grade of 0.79% in 2012. Total proven and probable reserves at Salobo increased to about 1,136 Mt at an average grade of 0.71% copper compared with 1,123 Mt at an average grade of 0.72% copper in 2012, which was attributed to cutoff grade changes and an improvement in the pit design. Vale continued with its Salobo expansion project, which was expected to increase Salobo's capacity to 200,000 t/yr of copper in concentrate. The company expected to complete the project in mid-2014 and to reach full capacity by 2016 (Vale S.A., 2014, p. 45, 47, 66, 70, 72).

Gold.—In 2013, the leading gold-producing companies included AngloGold Ashanti Ltd. of South Africa, Kinross Gold Corp. of Canada, Troy Resources Ltd. of Australia, Vale, and Yamana Gold Inc. of Canada. The leading producing States were Minas Gerais (46%), Goias (12%), Mato Grosso and Para (11% each), Amapa (8%), Bahia (7%), and Maranhao (4%) (Departamento Nacional de Produção Mineral, 2014b, p. 98).

Troy Resources, through its subsidiary Reinarda Mineração Ltda, held 100% interest in the Andorinhas project, which is located in the State of Para. The project included the Mamão and Lagoa Seca gold concessions. The company reported that Andorinhas was about to reach the end of its operational life and expected to close operations in 2014. In 2013, Andorinhas produced about 885 kg of gold compared with 1,165 kg in 2012. Troy Resources continued with its plans for the development of the Coruja pit deposit, which is located within the Andorinhas project and expected the approval of a mining license in 2014. Probable reserves at the Coruja pit were reported as 86,000 t at an average grade of 5.8 grams per metric ton (g/t) gold (Troy Resources Ltd., 2012a–c; 2013a–d, 2014a, p. 9, 17, 21; 2014b).

Vale recovered gold as a byproduct from its Salobo and Sossego Mines. Salobo had an estimated capacity of about 4,000 kilograms per year and a mine life of 53 years. In 2013, Salobo's gold production increased by about 485% to 3,640 kg compared with 622 kg in 2012, which was attributed to the mine rampup during the year. In February, Vale entered into an agreement with Silver Wheaton Corp. of Canada to sell 25% of the gold produced at Salobo during the life of the mine. Gold production at Sossego increased by about 4% to 2,430 kg in 2013 compared with 2,330 kg in 2012. As of 2013, proven and probable mineral reserves at Salobo and Sossego were estimated to be 1,136 Mt at an average grade of 0.4 g/t and 137 Mt at an average grade of 0.2 g/t, respectively (Vale S.A., 2014, p. 20, 48, 66–67, 95).

Yamana held 100% interest in the Chapada gold and copper mine located in the State of Goias and the Jacobina Mine located in the State of Bahia. In 2013, gold production from Chapada was about 3,000 kg compared with 3,400 kg in 2012. The company attributed the decrease in gold production at Chapada to anticipated lower grades and recovery rates. Yamana planned the development of a new gold and copper ore body, Corpo Soul, by the fourth quarter of 2014. Corpo Soul, which is located at the southwestern end of the main ore body of Chapada, was expected to increase future production to at least 3,700 kg of gold equivalent. The company expected to produce about 2,900 kg of gold equivalent in 2014. As of December 31, total proven and probable mineral reserves at Chapada were reported as 480 Mt at an average grade of 0.25 g/t gold. Gold production at Jacobina was about 2,100 kg in 2013 compared with about 3,300 kg in 2012. The decrease in production was attributed to lower throughput, lower feed grade, and higher dilution at the mine. As of December 31, total proven and probable mineral reserves at Jacobina were estimated to be about 24 Mt at an average grade of about 2.80 g/t gold. Yamana expected gold production at Jacobina to be about 2,500 kg in 2014 (Yamana Gold Inc., 2014, p. 14, 46, 142).

Yamana Gold also owned 100% interest in the C1 Santa Luz (Santa Luz) and the Pilar Mines, which are located in the State of Goias, and the Ernesto/Pau-a-Pique Mine in the State of Mato Grosso. The company began the commissioning (no commercial production) at Santa Luz and Ernesto/Pau-a-Pique in 2013. As of 2013, total proven and probable mineral reserves at Santa Luz were reported as about 26.7 Mt at an average grade of

1.57 g/t gold, and at Ernesto/Pau-a-Pique they were reported as 4.7 Mt at an average grade of 3.47 g/t gold. Ernesto/Pau-a-Pique was initially planned as an open pit operation at Ernesto and an underground operation at Pau-a-Pique with a common plant. During the year, Yamana Gold developed a new plan, which continued to include the development of Pau-a-Pique as an underground operation and the evaluation of a near-to-surface underground operation at Ernesto. The company also continued the evaluation of several satellite open pit deposits, previously identified, that could further contribute to the Ernesto/Pau-a-Pique operations. Exploration work was underway at Pilar, which included the development of the Caimar and Maria satellite deposits. Proven and probable reserves at Pilar were reported as 10.8 Mt at an average grade of 4.03 g/t gold. The company planned to complete the commissioning of Pilar in the third quarter of 2014 (Yamana Gold Inc., 2014, p. 18, 26, 30, 54, 60–63, 142).

In April, Beadell Resources Ltd. of Australia began commercial production at its 100%-owned Tucano gold mine, which is located in the State of Amapa. The company extracted high-grade oxide for its carbon-in-leach (CIL) gold plant with the capacity to process about 3.5 Mt/yr of ore. The Tucano Mine included the Duckhead deposit and Tap AB, Tap C, and Urucum pits. The company began operations at Duckhead in early August and it became the focus of the project owing to the high grades available from the deposit. During the year, Tucano processed about 3.6 Mt of oxide ore at a recovery rate of 92% and produced about 5,180 kg of gold. The company expected to produce between 5,700 and 6,200 kg of gold in 2014. As of December 31, reserves at Tucano were estimated to be 36.1 Mt at an average grade of 1.44 g/t gold and total mineral resources were estimated to be 111.0 Mt at an average grade of 1.39 g/t. Beadell Resources conducted a 10,000-meter (m) reverse-circulation drilling program at the Tartaruga project, which is located about 120 km northeast of Tucano. Inferred mineral resources at Tartaruga were estimated to be 6.5 Mt at an average grade of 1.63 g/t gold. The company reported that metallurgical tests showed that the quartzite gold at Tartaruga is highly leachable using conventional CIL methods with recoveries of 99.1% in oxide and 97.1% in fresh rock. Additional exploration work was underway at Duckhead and Tartaruga (Beadell Resources Ltd., 2014, p. 2, 7, 9, 16, 19, 20).

Iron and Steel.—*Pig Iron.*—Brazil produced more than 30.0 Mt of pig iron in 2013 compared with 30.7 Mt in 2012, which was a decrease of about 2.2%. In 2013, Brazil was the world's ninth-ranked pig iron producer, accounting for 2.4% of world production (Departamento Nacional de Produção Mineral 2014b, p. 72–73; Fenton, 2015).

Steel.—Brazil's major integrated steel operations consisted of 29 mills managed by 11 business groups; combined, the mills had an installed capacity of 48.4 Mt/yr of crude steel. Raw steel production decreased to 34.2 Mt in 2013 from about 34.5 Mt (revised) in 2012, or by almost 1.0%. Brazil exported 8.1 Mt of steel valued at $5.6 billion in 2013 compared with 9.7 Mt of steel valued at $6.9 billion in 2012. The major recipients of Brazil's steel exports were the United States (49.0%), Argentina (8.6%), Peru (4.5%), Colombia (3.3%), Bolivia (2.7%), Chile (2.1%), and Germany and Mexico (2.0% each). Brazil imported about 4 Mt of steel valued at $4.3 billion in 2013, which was similar to the amount imported in 2012. The apparent domestic consumption of steel in Brazil was about 26.5 Mt compared with 25.4 Mt in 2012 (Departamento Nacional de Produção Mineral, 2014b, p. 26–27; Instituto Aço Brasil, 2015).

Iron Ore.—In 2013, iron ore production decreased by about 4% to 386.3 Mt compared with 400.8 Mt in 2012, and iron content decreased by 5% to 245.7 Mt compared with 258.1 Mt in 2012. The decrease in iron ore production was attributed to adverse weather conditions in the northern and eastern regions of the country at yearend and the delay in the acquisition of an environmental license for the mines, which prevented the mines from operating at full capacity. Leading State producers of iron ore were Minas Gerais (which accounted for about 69% of the iron ore production), Para (27.3%), Mato Grosso do Sul (2.0%), and Amapa (1.6%). Leading iron ore producers included Companhia Siderúrgica Nacional S.A., Itaminas Comércio de Minérios S.A.; Mineração Usiminas S.A., MMX Sudeste Mineração Ltda., Samarco Mineração S.A, Vale, and Zamin Ferrous Ltd. of the United Kingdom. These companies accounted for about 90% of the iron ore production in the country. In 2013, Brazil exported about 282.2 Mt of iron ore valued at more than $25.9 billion compared with 275.4 Mt of iron ore valued at more than $23.8 billion, which was an increase of about 2% in volume and 9% in value. Brazil's major export partners for iron ore were China, which accounted for 51% of the country's iron ore exports, followed by Japan (10%), the Republic of Korea and the Netherlands (5% each), and Germany (3%) (Departamento Nacional de Produção Mineral, 2014b, p. 72–73).

In November, Anglo American plc of the United Kingdom sold its 100% interest in the Amapa iron ore mine to Zamin Ferrous. Amapa is located in the State of Amapa and had the capacity to produce about 6.0 Mt/yr of iron ore. During the year, Vale completed the construction of the Carajas plant 2 in the State of Para, with a nominal capacity of about 40 Mt/yr, and the construction of a concentration plant in Conceição Itabiritos in the State of Minas Gerais, which would provide an additional nominal capacity of 12 Mt/yr of pellet. Vale expected to begin operations at Carajas and Itabiritos in mid-2014. Samarco Mineração was a joint venture between BHP Billiton Ltd. (50% interest) and Vale (50%). The joint venture owned the Alegria and the Germano Mines, which are located in the State of Minas Gerais and had the capacity (combined) to produce about 22.0 Mt/yr of iron ore, and three pellet plants, which are located in the State of Espirito Santo and have a combined capacity of about 22.3 Mt/yr. The joint venture planned to begin production at its new fourth pellet plant in 2014. The new plant would have a capacity of 8.3 Mt/yr, which would increase Samarco's nominal pellet capacity to about 30.5 Mt/yr (Zamin Ferrous Ltd., 2013; Vale, 2014, p. 19, 26, 28, 71, 78).

Manganese.—Vale produced manganese through its subsidiaries Vale Manganês S.A., which operated the Morro de Mina open pit mine located in the State of Minas Gerais; Vale Mina do Azul S.A., which operated the Azul open pit located in the State of Para; and Mineração Corumbaense Reunida S.A., which operated the Urucum underground mine located in the State of Mato Grosso do Sul. In 2013, the mines produced about 2.4 Mt of manganese ore, which was about the same as that of 2012. In 2013, total proven and probable manganese ore reserves at Azul, Morro da Mina, and Urucum were reported as about 63.9 Mt at an average grade of about 37.9% manganese compared with 62.5 Mt at an average grade of about 37.1% manganese in 2012. The State of Para continued to be the leading State producer of manganese and accounted for 70% of the nation's production, followed by Minas Gerais (15%) and Mato Grosso do Sul (14%) (Departamento Nacional de Produção Mineral, 2014b, p. 86; Vale S.A., 2014, p. 35, 63).

Nickel.—In 2013, the leading State producers of nickel ore were Goias, which produced about 73% of the nation's production, Bahia (22%), Para (4%), and Minas Gerais (1%). The State of Goias produced about 6.0 Mt of ore and 69,532 t of nickel content, and the leading municipalities within the State were Niquelandia (62%), Barro Alto (33%), and Americano do Brasil (5%) (Departamento Nacional de Produção Mineral, 2014b, p. 96).

Vale produced ferronickel using the rotary kiln-electric furnace process at its Onça Puma location in Ourilândia do Norte in the State of Para. In November, the company resumed ferronickel production at Onça Puma, which was suspended in mid-2012 owing to damages to the operation's two furnaces. The company rebuilt one of the furnaces with a nominal capacity of 25,000 t/yr and was evaluating the opportunity to restart its second furnace, which would depend on the market outlook and the performance of its operating furnace. The Onça Puma open pit mine was built on lateritic nickel deposits of saprolitic laterite ore. As of 2013, total proven and probable reserves at the mine were reported as 95.3 Mt at an average grade of 1.61% nickel compared with 82.4 Mt at an average grade of 1.52% nickel in 2012. The increase in reserves was attributed to improvement work at the mine, which included a new mine dilution strategy. In 2013, nickel ore production was about 263,000 t at an average grade of 2.28% nickel compared with about 2.0 Mt at an average grade of 1.87% nickel in 2012. Production of nickel contained in ferronickel was about 1,900 t in 2013 compared with 6,000 t in 2012 (Vale S.A., 2013; 2014, p. 22, 40, 42–43, 65).

Anglo American produced nickel at its Barro Alto and Codemin operations, which were located in the State of Goias and had an annual capacity of 36,000 t and 10,000 t, respectively. In 2013, nickel production at Barro Alto increased by 16% to 25,100 t of nickel, which was attributed to operational improvements in the second half of the year. Codemin produced 9,300 t of nickel in 2013, which was slightly less than in 2012, as a result of a planned decrease in grade. A recovery plan at Barro Alto was underway, which included the rebuilding of two furnaces. The company planned to rebuild one of the furnaces by late 2014 and the second furnace by late 2015. Vale expected nickel production at Barro Alto and Codemin to be between 20,000 t and 25,000 t in 2015 and between 35,000 t and 38,000 t in 2016 (Anglo American plc, 2014a, p. 75; 2014b).

Niobium (Columbium) and Tantalum.—Anglo American, through its Anglo American Niobio Brasil Ltda., owned Boa Vista open pit mine, which was located in the State of Goias. Anglo American reported that with the end of the Boa Vista's weathered ore reserves approaching, the company would continue with the development of the Boa Vista fresh rock project. The project included the construction of a new upstream plant that would adapt the existing Catalao plant to process fresh rock instead of oxide ore. The company expected to begin production in 2014 and to increase its production capacity to about 6,500 t/yr of niobium from about 4,500 t/yr (Anglo American plc, 2014a, p. 41, 77).

In April, Advanced Metallurgical Group N.V. (AMG) of the Netherlands, through its subsidiary AMG Mineração S.A., announced an updated mineral resources estimate for its Volte Grande project, which is located in Nazareno in the State of Minas Gerais. Measured and indicated resources were reported as 14.7 Mt at average grades of 3,388.6 parts per million (ppm) lithium, 325.8 ppm tin, 318.3 ppm tantalum, and 57.8 ppm niobium using a cutoff of 69 ppm tantalum. The company also reported that Volte Grande had an estimated mine life of about 20 years based on current tantalum concentrate production levels, extraction and processing costs, and current economic conditions (Advanced Metallurgical Group N.V., 2013; Departamento Nacional de Produção Mineral, 2014b, p. 113).

Industrial Minerals

Cement.—In 2013, cement production increased by about 1% to about 70 Mt from 69 Mt (revised) in 2012. In 2013, the companies Cimento Nassau, InterCement, and Votorantim accounted for about 64% of Brazil's cement production. The southeast region of the country accounted for about 45% of the country's cement production, followed by the northeast (20%), south (17%), central-west (10%), and north (8%) (Departamento Nacional de Produção Mineral, 2014b, p. 52; Sindicato Nacional da Indústria do Cimento, 2014a; 2014b, 7, 17).

In 2013, Holcim Ltd., through its subsidiary Holcim (Brasil), completed the installation of a second kiln line at the Barroso cement plant, which was expected to come online by June 2015 and to add 2.3 Mt/yr of cement to the company's combined annual capacity. Lafarge completed the construction of its new cement plant, which is located in Santa Cruz in the State of Rio de Janeiro, that was expected to produce 500,000 t/yr of cement by 2015 and to reach full capacity of 750,000 t/yr after 2015. Cimento Nacional, which is a subsidiary of Brennand Group, continued with the construction of a new cement plant at Pitimbu in the State of Paraiba with the capacity to produce about 1.5 Mt/yr. The new plant was expected to be completed by 2017. Cimentos da Bahia S.A. (a subsidiary of Cimento Portland Participações S.A.) planned the construction of a new cement plant in Paripiranga in the State of Bahia. The cement plant would have a production capacity of about 2.0 Mt/yr of cement (Departamento Nacional de Produção Mineral, 2014b, p. 53; Holcim Ltd., 2014, p. 157, 250; Cimento Bravo, 2015; Cimento Nacional, 2015).

Diamond.—In 2013, the country produced about 49,000 carats of diamond, of which 61% was mined by garimpeiros (independent miners). The leading State producers were Mato Grosso (88%), Minas Gerais (11%), and Bahia (1%). Based on statistics reported by the Kimberley Process Certification Scheme, a total of 55,520 carats of diamond worth $6.7 million were exported in 2013. In terms of quantity, this indicated an increase of 47% compared with diamond exports in 2012; the value of the exports increased by 68%. In 2013, the country's major rough diamond export partners were, in order of value, the United States (45%), China (25%), Switzerland (20%), the United Arab Emirates (5%), Belguim (3%), and Israel (1%) (Kimberley Process Rough Diamond Statistics, 2013, 2014; Departamento Nacional de Produção Mineral, 2014b, p. 62).

Lipari Mineração Ltd. held 100% interest in the Braúna diamond project, which is located in Nordestina in the State of Bahia. Lipari planned the development of the B3 kimberlite deposit, which was the largest of the 22 kimberlite occurrences. The project was expected to become South America's first diamond mine developed in kimberlite rock. A mineral resource estimate of the B3 deposit was completed in January. Indicated mineral resources were estimated to be 1.8 million carats and inferred mineral resources were estimated to be more than 926,000 carats. The company expected the approval of its EIS in early 2014 and to begin commercial production by the first quarter of 2016. The company also expected to produce an average of about 225,000 carats per year during a mine life of 7 years (Instituto Brasileiro de Mineração, 2013a; Departamento Nacional de Produção Mineral, 2014b, p. 53; Lipari Mineração Ltd., 2014; 2015a, b).

Phosphate Rock.—Brazil produced more than 6.7 Mt of phosphate rock (concentrates), which was about the same amount as that produced in 2012. The State of Minas Gerais accounted for about 49% of the country's phosphate production followed by the States of Goias (36%), Sao Paulo (10%), and Bahia (4%). Imports of phosphate rock concentrates increased to 1.6 Mt in 2013 compared with almost 1.3 Mt in 2012, and domestic consumption of concentrates increased to 8.3 Mt in 2013 compared with 8.0 Mt in 2012. According to DNPM, Vale accounted for about 71% of Brazil's total production, followed by Copebrás S.A. (21%). Vale, through its subsidiary Vale Fertilizantes S.A., produced phosphate rock from its Araxa, Patos de Minas, and Tapira open pit mines, which are located in the State of Minas Gerais; the Cajati open pit mine in the State of Sao Paulo; and the Catalao open pit mine in the State of Goias. In 2013, Araxa produced 1.1 Mt of phosphate rock, which was about the same amount as that produced in 2012, and proven and probable reserves were reported as 132.1 Mt at an average grade of 11.7% P_2O_5 compared with 138.6 Mt at an average grade of 11.6% P_2O_5 in 2012. Phosphate rock production from Tapira decreased by about 10% to 1.9 Mt in 2013 compared with 2.1 Mt in 2012, and reserves were reported as 680.9 Mt at an average grade of 6.8% P_2O_5. The Catalao and the Cajati Mines produced about 1.1 Mt in 2013 compared with 1.0 Mt in 2012 and 640,000 t compared with 550,000 t, respectively. In 2013, reserves at Catalao were reported as 52.8 Mt at an average grade of 10.4% P_2O_5 compared with 57.9 Mt at an average grade of 10.6% P_2O_5 in 2012, and Cajatati reserves were reported as 114.4 Mt at an average grade of 5.2% P_2O_5 compared with 120.0 Mt at an average grade of 5.2% P_2O_5 in 2012 (Departamento Nacional de Produção Mineral, 2014b, p. 76–77; Vale S.A., 2014, p. 49, 68).

Vermiculite.—In 2013, the State of Goias produced about 85.5% of the total vermiculite production in the country, followed by the States of Pernambuco (4.2%), Paraiba (7.8%), and Bahia (2.5%). Vermiculite exports increased by 11% to 40,700 t in 2013 compared with 36,615 t in 2012 and major vermiculite export partners were the European Union (38%), the United Arab Emirates (10%), and Mexico (9%). The apparent domestic consumption of vermiculite in Brazil increased by about 77% to 27,259 t in 2013 compared with 15,388 Mt in 2012, and was mainly used for agriculture and civil construction. Brasil Minérios Ltda., located in São Luiz dos Montes Belos in the State of Goias, had the capacity to produce about 100,000 t/yr of vermiculite concentrate. The company expected to increase its production to about 60,000 t/yr in 2014 and to 100,000 t/yr by 2020 (Departamento Nacional de Produção Mineral, 2014b, p. 122–123; Brasil Minérios Ltda., 2015).

Mineral Fuels and Other Sources of Energy

Coal.—In 2013, Brazil produced more than 7.4 Mt of beneficiated coal compared with 6.6 Mt in 2012. The Brazilian coal industry's mine operations were concentrated in the three southernmost States of Parana, Rio Grande do Sul, and Santa Catarina. Coal was consumed by electricity generation (81.1%), and by the production of pulp and paper (4.9%), petrochemicals (3.3%), food (2.9%), cement and metallurgy (1.3%), and other (2.7%). To meet Brazil's coal (coke, metallurgical) demand, 20.3 Mt valued at $2.9 billion was imported in 2013 compared with 18.4 Mt valued at $3.6 billion in 2012. Imports came from the United States (38%), Australia (17%), Colombia (16%), Canada (9%), and Russia (6%). Copelmi Mineração Ltda. (Copelmi) produced coal from the Mina do Butia Leste, Mina do Cerro, Mina Charqueadas, and Mina do Recreio, which were located in Rio Grande do Sul. The company's main operation was Mina do Recreio with an annual capacity of about 2 Mt of coal (Departamento Nacional de Produção Mineral, 2014b, p. 46; Copelmi Mineração Ltda., 2015a, b).

Natural Gas.—In 2013, Brazil's gross natural gas production increased by 9.1% to about 28.2 billion cubic meters compared with a revised 25.8 billion cubic meters in 2012. The increase in production was attributed to an increase in the production of natural gas from the pre-salt fields, which increased to about 78% in 2013. In 2013, offshore natural gas production accounted for about 73% of the national natural gas production. Brazilian natural gas operations were concentrated in the States of Rio de Janeiro (36%), Espirito Santo (16%), Amazonas (15%), Bahia (11%), Sao Paulo (10%), Maranhao (5%), Sergipe (4%), and Alagoas and Rio Grande do Norte (2% each). In 2013, proven offshore reserves were reported as 388 billion cubic meters, which accounted for about 85% of the total natural gas proven reserves. The State of Rio de Janeiro accounted for 56% of the total proven reserves and 66% of the total offshore reserves (National Agency of Petroleum Natural Gas and Biofuels, 2014, p. 32, 34, 36)

Petroleum.—Brazil's offshore deposits hold the vast majority of Brazil's proven reserves, which are estimated to be 14.7 Gbbl, or 94% of the country's proven reserves. In 2013, offshore crude oil production accounted for about 91% of the total crude oil production. The State of Rio de Janeiro accounted for about 80% of the total proven reserves and 72% of the total crude oil production. In 2013, Brazil's oil production decreased by 2% to 738.7 Mbbl compared with 754.4 Mbbl (revised) in 2012. Pre-salt areas accounted for 15% of total crude oil production and, in 2013, production from pre-salt areas increased by 77% to 110.5 Mbbl compared with 62.5 Mbbl in 2012 (National Agency of Petroleum Natural Gas and Biofuels, 2014, p. 31, 33).

According to the ANP, at least 363 onshore and offshore fields were in the production phase and 73 fields were in the development phase, and were located in the States of Alagoas, Amazonas, Bahia, Espiritu Santo, Maranhao, Parana, Rio Grande do Norte, Rio de Janeiro, Santa Catarina, Sergipe, and Sao Paulo. Also, 339 onshore and offshore fields were in the exploration phase and were located in the Alagoas, Amazonas, Barreirinhas, Camamu, Campos, Ceara, Espirito Santo, Foz do Amazonas, Jequitinhonha, Para-Maranhao, Parecis-Alto Xingu, Parnaíba, Pelotas, Pernambuco-Paraiba, Potiguar, Reconcavo, Santos, Sao Francisco, Sergipe, Solimoes, and Tucano Sul sedimentary basins. Companies engaged in exploration included Petrobras; Ecopetrol S.A. of Colombia; Total S.A. of France; Statoil ASA of Norway; United Kingdom companies BG Group plc, BP p.l.c., and Chariot Oil and Gas Ltd.; and U.S. companies Anadarko Petroleum Corp. and Exxon Mobil Corp. (National Agency of Petroleum Natural Gas and Biofuels, 2014, p. 19–31, 33).

Petrobras's offshore and onshore fields had the capacity to produce about 28.2 Mbbl of crude oil and were located in the States of Alagoas, Amazonas, Bahia, Ceara, Espiritu Santo, Rio de Janeiro, Rio Grande do Norte, Sao Paulo, and Sergipe. The company's business and management plans for 2014 through 2018 estimate investments on the order of $220.6 billion, of which about 70% would be invested in exploration and production and $82 billion of that would be used for the pre-salt oil fields. The company planned to produce 3.2 million barrels per day (Mbbl/d) of crude oil by 2018 and 4.2 Mbbl/d by 2020, and pre-salt fields were expected to account for about 52% of the total production by 2018 (Petróleo Brasileiro S.A., 2014b, p, 13).

During 2013, Petrobras completed nine new platforms (Cidade de ltajai, Cidade de Paraty, Cidade de Sao Paulo, P–55, P–58, P–61, P–62, P–63, and SS–88 TAD), which would add 1 billion barrel per day of oil production capacity. In January, Cidade de São Paulo began production in the Santos Basin pre-salt region (Sapinhoá Field) with the daily capacity to process 120,000 barrels per day (bbl/d) of oil and 5 million cubic meters per day of natural gas. In February, Cidade de Itajaí began production with the capacity to process 80,000 bbl/d of light oil and 2 million cubic meters per day of natural gas. The Cidade de Itajaí was located in the Santos Basin post-salt region (Baúna and Piracicaba fields), about 210 km off the coast. In June, Cidade de Paraty began production in the Santos Basin pre-salt region; about 300 km off the coast at a depth of 2,120 m and had the capacity to process 120,000 bbl/d of oil and 5 million cubic meters per day of natural gas. The P–55 began production later in 2013 and was located at the Roncador field, Campos Basin (depth 1,800 m). P–55 had the capacity to process 180,000 bbl/d of oil and 4 million cubic meters per day of natural gas. P–63 began operation in November with the capacity to process 140,000 bbl/d of oil and 1 million cubic meters per day of natural gas. P–63 was the first production system at Papa-Terra (Campos Basin and included P–61 and SS–88 TAD). P–61 was expected to begin operations in mid-2014. The P–58 was located about 85 km off the coast of Espirito Santo, in water depths of 1,400 m, and had the capacity to process about 180,000 bbl/d of oil and 6 million cubic meters per day of natural gas from pre-salt and post-salt reservoirs. The P–58 was expected to begin operations in early 2014. The P–62 was located about 125 km offshore in the Campos Basin at water depths of 1,600 m; it was expected to begin operation in mid-2014. The P–62 had the capacity to process 180,000 bbl/d of oil and 6 million cubic meters per day of natural gas from post-salt reservoirs (Petróleo Brasileiro S.A., 2014a).

In October 21, the Government through the ANP opened its first bidding round for the Libra pre-salt block. The block, which was located in the Santos Basin, covers an area of about 1,548 square kilometers, and reserves were estimated to be between 3.7 to 15 Gbbl. The ANP awarded to the consortium made up of Petrobras (40% interest), Royal Dutch Shell plc of the United Kingdom (20%), Total S.A. of France (20%), and China National Offshore Oil Corp. and China National Petroleum Corp. (10% each) the rights and obligation for the pre-salt block. The consortium's exploration program included three-dimensional seismic studies for the entire area, two exploratory wells, and one extended well test. Petrobras would be the operator of the Libra (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, 2013; Petróleo Brasileiro S.A., 2014b, 2015a).

Renewable Energy.—In 2013, sources of primary energy in Brazil included nonrenewable energy sources, such as petroleum (which accounted for about 41% of the total primary energy production), natural gas (11%), and steam coal and uranium (1% each), and renewable energy, which accounted for about 46% of the total primary energy production. Renewable sources included hydraulic sources, firewood, and sugar cane products. Brazil's total energy consumption increased by 3% compared with that of 2012. Brazil's total energy consumption sources included oil products, which included diesel oil, fuel oil, gasoline, kerosene, liquefied petroleum gas, and naphtha (about 44%), and natural gas (7%). Domestic electricity supply by sources included hydraulic (71%), natural gas (11%), biomass (8%), oil products (4%), carbon (3%), nuclear (2%), and wind (1%) (Empresa de Pesquisa Energética, 2014, p. 16, 19–24).

In 2013, ethanol production in the country increased by 18%, and biodiesel, by 7%. The southeast region of the country was the leading producer of ethanol and accounted for 62% of the total production. In 2013, Brazil exported about 2.9 billion cubic meters of ethanol compared with about 3.1 billion cubic meters in 2012 and imported about 131.7 million cubic meters of ethanol compared with 553.9 million cubic meters in 2012. The United States received about 60% of the country's ethanol exports in 2013. Brazil had 64 biodiesel plants with a combined capacity of about 22,000 cubic meters per year. Petrobras, through its subsidiary Petrobras Biocombustiveis, owned three plants located in the States of Bahia, Ceara, and Minas Gerais with a combined capacity of about 1,300 cubic meters per year. Petrobras planned to invest about $2.3 billion in Petrobras Biocombustiveis for the period between 2014 and 2018. The company expected to increase by 24% its share in the biodiesel market and by 15% in the ethanol market by 2030 (National Agency of Petroleum Natural Gas and Biofuels, 2014, p. 62–67; Petróleo Brasileiro S.A., 2014b, p. 14; Petrobras Biocombustiveis, 2015).

Reserves and Resources

Brazil was among the world leaders in its reserves of some mineral commodities (table 3). According to the DNPM, the country's world rankings for reserves of mineral commodities were as follows: first, barite, graphite, and niobium; second, tantalum and rare earths; third, nickel and tin; and fourth, iron ore, magnesite, manganese, talc, vanadium, and zirconium (Departamento Nacional de Produção Mineral, 2014b, p. 3).

Outlook

According to the International Monetary Fund, Brazil is recovering gradually from the slowdown in growth that started in mid-2011, but the recovery remains uneven and inflation elevated. Output is estimated at potential with supply-side constraints linked to tight labor market conditions and protracted weak investment since 2011, which is limiting near-term growth. The recovery is likely to continue during 2014, supported by investment and consumption. The country forecasted an increase in the GDP of 0.1% in 2014. According to the Economic Commission for Latin America and the Caribbean, Brazil is likely to post slower growth in 2014. Foreign trade in goods is likely to decrease in 2014—exports by 3.0% and imports by 3.2% (International Monetary Fund, 2013, p. 2; 2015, p. 3; Economic Commission for Latin America and the Caribbean, 2014, p. 27, 48).

Leading sources of investments in the mineral sector were likely to be consortia, joint ventures, and acquisitions in new projects with Petrobras, Vale, and other domestic companies. Brazil is likely to increase the number of domestic and foreign investors in the country, if proposed developments in the mineral industry, in particular, in the metals, natural gas and petroleum, and biofuels and ethanol industries come to fruition. In the short term, investors will continue waiting for the legal and regulatory definitions of the new proposed regulatory framework for mining and improvement in the global mineral commodities market to validate planned investments. In the long term, new projects, such as the development of the Boa Vista fresh rock, the Braúna diamond, and the Rondon Alumina projects; the commissioning of Ernesto/Pau-a-Pique, Pilar, and Santa Luz gold mines; the possibility of developing the Corpo Soul and Coruja gold deposits; the expansion of the Salobo copper project; and the construction of the Carajas plant, the Conceição Itabiritos's concentration plant, and Samarco Mineração's fourth pellet plant are likely to increase interest in nonfuel mineral prospecting and to attract investments. If the development of the Brauna project comes to fruition, the diamond mine is likely to become the first in South America. In the longer term, increasing the country's crude oil and natural gas production from the large pre-salt crude oil deposits could transform Brazil into one of the leading crude oil producers in the world. Also, Petrobras's investments in biofuels indicate its commitment to the development of renewable energy sources, along with creating and improving technologies that ensure global leadership in the production of biofuels through consortiums with foreign investors.

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TABLE 1

BRAZIL: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2, 3]		2009	2010	2011	2012	2013
METALS						
Aluminum:						
Bauxite, dry basis, gross weight		28,060,000	29,000,000	31,768,000	33,260,000	32,867,000
Alumina		7,800,000	9,433,000	10,306,000 [r]	10,320,000 [r]	10,517,000
Metal:						
Primary		1,536,000	1,536,000	1,440,000	1,436,000	1,304,000
Secondary		250,000	252,000	240,000	230,000	208,000
Total		1,786,000	1,788,000	1,680,000	1,666,000	1,512,000
Chromium:						
Crude ore		365,210	520,129	542,512	472,501	485,951
Concentrate and lump, Cr_2O_3 content		246,900	258,308	217,198	187,070	189,088
Cobalt:						
Mine output		2,075	3,139	3,623	2,900	3,500
Metal		1,012	1,369	1,614	1,750	1,871
Copper:						
Mine output, Cu content		211,692	213,548	213,760	223,141	270,979
Metal, refined:						
Electrowon		6,500	4,497 [r]	4,500 [r]	4,374 [r]	4,000
Primary		193,899	222,297	222,550	186,000	234,150
Secondary		31,000	23,000	22,800	24,700	27,800
Total		231,399	249,794 [r]	249,850 [r]	215,074 [r]	265,950
Gold:						
Mine output	kilograms	52,207	55,592	56,969	56,670	67,964
Garimpeiros, independent miners	do.	8,123	6,455	8,240	10,103	11,609
Total	do.	60,330	62,047	65,209	66,773	79,573

See footnotes at end of table.

TABLE 1—Continued
BRAZIL: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2, 3]		2009	2010	2011	2012	2013
METALS—Continued						
Iron and steel:						
Iron ore and concentrate, marketable product:						
Gross weight	thousand metric tons	298,528	372,120	398,131	400,822	386,270
Fe content	do.	198,771	247,772	265,091	258,129	245,668
Metal:						
Pig iron	do.	25,135	30,898	33,243	30,745	30,000
Ferroalloys, electric arc furnace:						
Ferrochromium		131,048	277,114	145,122	165,532	189,088
Ferrochromium silicon		11,506	16,020	8,378	9,556	10,200
Ferromanganese		42,317 [r]	92,047 [r]	82,271 [r]	93,553 [r]	93,273
Ferronickel		37,708 [r]	33,860 [r]	90,800 [r]	148,800 [r]	169,200
Ferroniobium (ferrocolumbium)		34,746	52,588	53,691 [r]	50,562 [r]	46,555
Silicomanganese		111,777 [r]	213,761 [r]	213,729 [r]	213,447 [r]	217,727
Silicon metal[e]		132,000	132,000	132,000 [r]	133,000 [r]	134,000
Other ferroalloys		25,685	32,897	34,462	33,449	33,500 [e]
Total[e]		526,800 [r]	850,300 [r]	788,100 [r]	874,000 [r]	917,500
Crude steel, excluding castings	thousand metric tons	26,500	32,928	35,220 [r]	34,524 [r]	34,163
Lead:						
Mine output, Pb content in concentrate		15,890	19,650	15,100	16,953	19,468
Metal, secondary		104,160	114,887	138,537	165,397	151,964
Manganese:						
Ore and concentrate, marketable:[4]						
Gross weight		2,320,000	3,125,000	2,738,000 [r]	2,796,000 [r]	2,833,000
Metal content		900,000 [r]	1,223,000	1,139,000 [r]	1,164,000 [r]	1,180,000
Metal:[e]						
Primary		19,580 [5]	19,600	19,600	19,600	19,600
Secondary		1,520 [5]	1,710	1,710	1,710	1,710
Nickel:						
Mine output, ore		4,333,069	11,128,385	13,203,844	14,749,112	13,006,961
Ni content in ore		41,059	108,983	131,673	139,230	104,829
Ni content in carbonate		16,766	18,580	19,381	19,611	19,958
Ni content in matte		8,518	14,308	13,703	14,345	11,641
Ni, electrolytic		16,598	19,111	20,521	21,437	19,823
Ferronickel, Ni content		9,427	8,465	16,750	31,342	34,501
Niobium (columbium)-tantalum ores and concentrates, gross weight:						
Columbite and tantalite		218	176	136	118	185
Pyrochlore concentrate, Nb_2O_5 content		88,920	63,329	64,657	82,214	73,668
Rare-earth metals, monazite concentrate, gross weight[6]		303	249	290	206	600
Silver						
Primary	kilograms	35,000	37,000	37,600	36,400	38,200
Secondary	do.	31,000	32,000	34,000	35,500	34,300
Total	do.	66,000	69,000	71,600	71,900	72,500
Tin:						
Mine output, Sn content		9,500	10,400	10,725	13,667	16,830
Metal, smelter, primary		8,311	9,098	9,382	11,955	14,721
Titanium:						
Ilmenite:						
Gross weight		52,800	166,000 [e]	166,000 [e]	166,000 [e]	166,000 [e]
TiO_2 content		39,117	53,928	68,804	69,071	78,264
Rutile, TiO_2 content		2,737	2,331	2,350	1,881	2,021
Tungsten, mine output, W content		192	166	244	381	494
Zinc:						
Mine output, Zn content		172,688	211,203	197,840	164,258	152,147
Metal, smelter, primary		242,136	288,107	284,770	246,526	242,000 [e]
Zirconium, zircon concentrate, gross weight[7]		34,248	23,236	23,283	20,425	21,154

See footnotes at end of table.

TABLE 1—Continued
BRAZIL: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2, 3]		2009	2010	2011	2012	2013
INDUSTRIAL MINERALS						
Asbestos, fiber		288,452	302,257	306,321	304,569	290,825
Barite:						
Crude		196,860	198,161	216,478	186,134	34,943
Beneficiated		49,847	41,385	7,039	3,025	--
Calcite	thousand metric tons	14,565	18,930	28,718	33,077	33,131
Cement, hydraulic	do.	51,748	59,118	64,093	69,323 [r]	69,975
Clays:						
Bentonite, beneficiated		264,243	531,693	566,267	512,975	434,000
Kaolin:						
Crude		7,928,000	6,451,000	6,216,000	7,059,000	6,461,000
Beneficiated		1,987,000	2,000,000	1,927,000	2,189,000	2,139,000
Diamond, gem and industrial:[e]						
Private sector	thousand carats	11	13	18	19	19
Garimpagem	do.	10	12	28	30	30
Total[8]	do.	21	25	46	49 [r]	49
Diatomite:						
Crude		7,534	9,264	4,415	3,427	1,947
Beneficiated		4,350	4,082	4,224	1,987	2,475
Feldspar:						
Crude ore		160,760	363,251	416,008	328,001	320,048
Beneficiated		115,264	276,448	333,352	247,152	294,357
Fluorspar:						
Concentrates, marketable product:						
Acid-grade		28,803	6,295	6,197	5,768	6,835
Metallurgical-grade		15,161	18,152	18,843	18,380	20,886
Total		43,964	24,447	25,040	24,148	27,721
Graphite, concentrate		59,425	92,364	105,188	88,110	91,908
Gypsum and anhydrite, crude		2,348,390	2,638,096	3,228,931	3,749,860	3,332,991
Lithium, concentrates		15,929	15,733	7,820	7,084	7,982
Magnesite:						
Crude		1,234,041	1,535,052	1,576,871	1,753,067	1,542,420
Beneficiated		409,909	483,882	476,805	479,304	557,431
Phosphate rock, including apatite:						
Concentrate:						
Gross weight	thousand metric tons	6,084	6,192	6,738	6,740	6,715
P_2O_5 content	do.	2,163	2,179	2,374	2,388	2,504
Potash, marketable (K_2O)		452,698	417,990	395,002	346,509	310,892
Potassium (KCl)		716,630	661,690	625,300	548,500	492,151
Quartz crystal, all grades		11,588	13,024	17,657	16,254	10,696
Salt:						
Marine	thousand metric tons	4,462	5,615	4,829	6,079	5,926
Rock	do.	1,443	1,415	1,335	1,403	1,349
Total	do.	5,905	7,030	6,164	7,482	7,275
Sulfur, byproduct:						
Metallurgy		275,593 [r]	286,875 [r]	322,120 [r]	274,693 [r]	324,405
Petroleum		143,599 [r]	143,147 [r]	170,136 [r]	222,561 [r]	218,014
Total		419,192 [r]	430,022 [r]	492,256 [r]	497,254 [r]	542,419
Talc and pyrophyllite, crude		577,935	507,085	578,954 [r]	593,140 [r]	737,950
Vermiculite, concentrate		50,438	49,976	54,970	51,986	68,014
MINERAL FUELS AND RELATED MATERIALS						
Coal, bituminous:						
Run-of-mine	thousand metric tons	13,578	11,837	12,306	12,704	14,376
Beneficiated/marketable[4]	do.	5,818	5,743	5,614	6,635	7,407
Coke, metallurgical, all types	do.	7,259	9,189	8,286	8,681	8,700 [e]

See footnotes at end of table.

TABLE 1—Continued
BRAZIL: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2, 3]		2009	2010	2011	2012	2013
MINERAL FUELS AND RELATED MATERIALS—Continued						
Natural gas, gross	million cubic meters	21,141 [r]	22,938 [r]	24,074 [r]	25,832 [r]	28,174
Natural gas liquids	million 42-gallon barrels	28,717 [r]	30,204 [r]	31,942 [r]	32,131 [r]	32,938
Petroleum:[9]						
Crude[10]	thousand 42-gallon barrels	711,883 [r]	749,954 [r]	768,471 [r]	754,409 [r]	738,715
Refinery products:						
Asphalt	do.	13,145	17,405	15,501	16,162	16,689
Fuel oil	do.	88,394	87,396	83,077	86,113	92,844
Gasoline	do.	131,297 [r]	145,086 [r]	156,528 [r]	170,206 [r]	186,934
Jet fuel	do.	27,555 [r]	29,339 [r]	33,934 [r]	34,108 [r]	34,935
Kerosene	do.	27,272 [r]	29,492 [r]	34,128 [r]	34,260 [r]	35,034
Liquefied petroleum gas	do.	62,952 [r]	61,002.66 [r]	62,698 [r]	65,171 [r]	64,332
Lubricants	do.	3,735 [r]	3,793.66 [r]	3,652 [r]	3,824 [r]	4,335
Naphtha	do.	52,913	46,265.56	39,902	40,506	33,675
Solvents	do.	2,906	3,199.60	2,558	1,826	2,857
Total	do.	410,169 [r]	422,980 [r]	431,979 [r]	452,176 [r]	471,636 [r]

[e] Estimated; estimated data are rounded to no more than thee significant digits; may not add to totals shown. [r] Revised. do. Ditto. -- Zero.

[1] Table includes data available through March 10, 2015.

[2] In addition to the commodities listed, bismuth, crude graphite, crude sodalite, ferrosilicon, ferrosilicon magnesium, inoculant, leucite, molybdenite, precious and semiprecious stones except diamond, sand and gravel, silica (silex), sodium compounds, stone, uranium oxide, and other minerals are produced, but available information is inadequate to make reliable estimates of output.

[3] Source: Departamento Nacional de Produção Mineral, Sumário Mineral 2013 and 2014.

[4] Direct sales and (or) beneficiated (marketable product).

[5] Reported figure.

[6] Production was derived from stockpiled mineral concentrates.

[7] Includes baddeleyite-caldasite.

[8] Figures represent officially reported diamond output plus official estimates of output by nonreporting miners.

[9] Source: Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, Oil, Natural Gas and Biofuels Statistical Mineral Yearbook 2014; Empresa de Pesquisa Enérgetica, Ministério de Minas e Energia, Brazilian Energy Balance.

[10] Condensates are included.

TABLE 2
BRAZIL: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity^{e}
METALS			
Alumina	Alcoa Alumínio S.A. (Alcoa Inc., 100%)	Pocos de Caldas, Minas Gerais State (refinery)	390.
Do.	Alcoa World Alumina Brasil Ltda. (Alcoa Inc. and Alumina Ltd., 39%; BHP Billiton plc, 36%; Alcoa Alumínio S.A., 15%; Rio Tinto Alcan Inc., 10%)	Sao Luiz, Maranhao State (refinery)	3,500.
Do.	Alumina do Norte do Brasil S.A. (Norsk Hydro ASA, 91%)	Barcarena, Para State (refinery)	6,200.
Do.	Companhia Brasileira de Alumínio S.A. (CBA) (Votorantim Group, 100%)	Aluminio City, Sao Paulo State (refinery)	475.
Do.	Novelis do Brasil Ltda. (Hindalco Industries Ltd., 100%)	Ouro Preto, Minas Gerais State (refinery)	145.
Aluminum	Albras Alumínio Brasileiro S.A. (Norsk Hydro ASA, 51%, and Nippon Amazon Aluminio Co. Ltd., 49%)	Barcarena, Para State (smelter)	460.
Do.	Alcoa Alumínio S.A. (Alcoa Inc., 100%)	Pocos de Caldas, Minas Gerais State (smelter)	96.
Do.	Alcoa Alumínio S.A., 60%, and BHP Billiton plc, 40%	Sao Luiz, Maranhao State (smelter)	447.
Bauxite	Alcoa Alumínio S.A. (Alcoa Inc., 100%)	Pocos de Caldas, Minas Gerais State (mine)	1,100.
Do.	Alcoa World Alumina Brasil Ltda. (Alcoa Inc., 60%, and Alumina Ltd., 40%)	Juruti, Para State (mine)	4,400.
Do.	Companhia Brasileira de Alumínio S.A. (CBA) (Votorantim Group, 100%)	Itamarati de Minas, Miraí, and Pocos de Caldas Mines, Minas de Gerais State (mines)	3,000.
Do.	Mineração Paragominas S.A. (Norsk Hydro ASA, 67.9%, and Vale S.A., 32.1%)	Paragominas, Para State (mine)	9,200.
Do.	Mineração Rio do Norte S.A. (Vale S.A., 40%; BHP Billiton plc, 14.8%; Rio Tinto Alcan Inc., 12%; Companhia Brasileira de Alumínio S.A. (CBA), 10%; Alcoa Aluminio S.A., 8.58%; Alcoa World Alumina, 5%; Norsk Hydro ASA, 5%; Alcoa World Alumina Brasil Ltda, 4.62%)	Porto Trombetas, Para State (mine)	18,100.
Chromite	Companhia de Ferro Ligas da Bahia (FERBASA) (private, 100%)	Pedrinhas Mine, Campo Formosa, Bahia State	120 (concentrate).
Do.	do.	Ipueira Mine, Campo Formosa, Bahia State	48 (concentrate).
Copper:			
Concentrate	Mineração Caraíba S/A (Glencore plc, 28.5%)	Jaguarari, Bahia State (3 mines)	30.
Do.	do.	Salobo Mine, Carajas, Para State	100.
Do.	Yamana Gold Inc. (private, 100%)	Chapada Mine, Goias State	85.
Refinery	Caraíba Metais S.A. (Paranapanema S.A., 100%)	Camacari, Bahia State (electrolytic plant)	280.
Do.	Mineração Caraíba S/A (Glencore plc, 28.5%)	Jaguarari, Bahia State (electrowinning plant)	5.
Ferroalloys	Vale Manganês S.A. (Vale S.A., 100%)	Barbacena, Minas Gerais State (plant)	74.
Do.	do.	Ouro Preto, Minas Gerais State (plant)	65.
Do.	do.	Simões Filho, Bahia, Mato Grosso do Sul (plant)	150.
Gold kilograms	Vale S.A. (private, 100%)	Sossego Mine, Carajas, Para State	3,000.
Do. do.	do.	Salobo Mine, Carajas, Para State	4,000.
Do. do.	Beadell Resources Ltd. (private, 100%)	Tucano Mine, Amapa State	6,200.
Do. do.	AngloGold Ashanti Córrego do Sítio Mineração (Anglo GoldAshanti Ltd., 100%)	Sabara and Santa Barbara, Minas Gerais State	8,100.
Do. do.	do.	Serra Grande Mines, Crixas, Goias State (3 mines)	6,000.
Do. do.	Jaguar Mining Inc., 100%	Caeté Mines, Minas Gerais State (2 mines)	4,000.
Do. do.	do.	Turmalina Mine, Minas Gerais State	3,000.
Do. do.	Kinross Brasil Mineração S.A. (Kinross Gold Corp., 100%)	Paracatu Mine, Minas Gerais State	16,000.
Do. do.	Reinarda Mineração Ltda (Troy Resources Ltd., 100%)	Andorinhas Mine, Para State	1,400.
Do. do.	Yamana Gold Inc. (private, 100%)	Chapada Mine, Goias State	4,000.
Do. do.	do.	Jacobina Mine, Bahia State	4,000.
Do. do.	do.	Fazenda Brasileiro Mine, Goias State	2,000.
Iron ore and steel:			
Iron ore	Companhia Siderúrgica Nacional S.A. (private, 100%)	Casa de Pedra Mine, Congonhas, Minas Gerais State	21,000.
Do.	Itaminas Comércio de Minérios S.A. (private, 100%)	Itaminas, Minas Gerais State	5,000.
Do.	Mineração Usiminas S.A. (Usiminas, 70%, and Sumitomo Corp., 30%)	Quadrilátero Ferrífero, Serro Azul, Minas Gerais State (4 mines)	12,000.

See footnotes at end of table.

TABLE 2—Continued
BRAZIL: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
METALS—Continued			
Iron ore and steel:			
Iron ore—Continued	MMX Sudeste Mineração Ltda. (private, 100%)	Tico-Tico and Ipe Mines, Serro Azul, Minas Gerais State (mines)	6,000.
Do.	do.	Corumba, Mato Grosso do Sul State (mines)	1,500.
Do.	Samarco Mineração S.A. (Vale S.A., 50%, and BHP Billiton Ltd., 50%)	Alegria and Germano Mines, Minas Gerais State (2 mines)	22,000.
Do.	Vale S.A. (private, 100%)	Carajas Mine, Parauapebas, Para State (3 mines)	110,000.
Do.	do.	Itabira, Mariana, and Minas Centrais, Minas (8 mines)	120,000.
Do.	do.	Minas Itabirito, Vargem Grande, and Paraopeba, Minas Gerais State (11 mines)	80,000.
Do.	do.	Urucum and Corumba Mines, Mato Grosso do State (2 mines)	6,500.
Do.	Zamin Ferrous Ltd., 100%	Amapa Mine, Amapa State	6,000
Pellets	Companhia Hispano Brasileira De Pelotização S.A. (Vale S.A., 50.9%, and ArcelorMittal, 49.1%)	Hispanobras, Espirito Santo State (pellet plant)	4,300.
Do.	Samarco Mineração S.A. (Vale S.A., 50%, and BHP Billiton Ltd., 50%)	Ponta Ubu, Anchieta, Espirito Santo State (three pellet plants)	22,300.
Do.	Vale S.A. (private, 100%)	Tubarao I and II, Espirito Santo State (pellet	29,200.[1]
Do.	do.	Fabrica, Minas Gerais State (pellet plant)	4,500.
Do.	do.	Sao Luis, Maranhao State (pellet plants)	7,500.[1]
Do.	do.	Vargem Grande, Minas Gerais State (pellet	7,000.
Steel, crude	Gerdau Açominas S.A. (Gerdau S.A., 100%)	Rodovia, Minas Gerais State	7,600.
Do.	Aperam S.A. (private, 100%)	Timoteo, Minas Gerais State (specialty steel)	900.
Do.	ArcelorMittal Tubarão (ArcelorMittal)	Grande Vitoria, Espirito Santo	7,500
Do.	Companhia Siderúrgica Nacional (private, 100%)	Volta Redonda, Rio de Janeiro State	5,600.
Do.	Usinas Siderúrgicas de Minas Gerais, S.A. (private, 100%)	Ipatinga, Minas Gerais State and Cubatao, Sao Paulo	9,500.
Do.	Siderúrgica Norte Brasil S.A (private, 100%)	Maraba, Para State	390.
Lead	Votorantim Metais (Votorantim Group, 100%)	Moro Agudo Mine, Paracatu, Minas Gerais State	13.
Manganese	Vale Manganês S.A. (Vale S.A., 100%)	Morro da Mina, Minas Gerais State	100.
Do.	Vale Mina do Azul S.A. (Vale S.A., 100%)	Mina do Azul, Carajas, Para State	1,900.
Do.	Mineração Corumbaense Reunida S.A. (Vale S.A., 100%)	Urucum, Mato Grosso do Sul State	400.
Nickel	Anglo American plc, 100%	Barro Alto, Goias State (refinery)	36 (metal).
Do.	CODEMIN S.A. (Anglo American plc, 100%)	Condemin, Goias State (refinery)	10 (metal).
Do.	Votorantim Metais (Votorantim Group, 100%)	Fortaleza de Minas, Minas Gerais State (mine)	19 (nickel matte).[1]
Do.	do.	Niquelandia, Goias State (mine)	30 (ore).
Do.	do.	Niquelandia, Goias State and Sao Miguel Paulista, Sao Paulo (refinery plants)	25 (electrolytic).
Do.	Vale S.A. (private 100%)	Onca Puma, Ourilandiado Norte, Para State	25 (iron-nickel alloy).
Niobium (columbium)	Companhia Brasileira de Metalurgia e Mineração (Moreira Salles Group., 70%)	Araxa, Minas Gerais State (mine)	120 (ore).
Do.	do.	Araxa, Minas Gerais State (beneficiation plant)	6,000 (pyrochlore).
Do.	Anglo American Niobio Brasil Ltda. (Anglo American plc, 100%)	Boa Vista, Goias State (mine)	4.
Do.	do.	Ouvidor, Goias State (beneficiation plant)	1,300 (pyrochlore).
Tantalum metric tons	Mineração Taboca S.A. (Minsur, 100%)	Pitinga Mine, Amazonas State and Fundicion de Pinpora, Sao Paulo State	120 (concentrate).
Do. do.	AMG Mineração S.A. (Advanced Metallurgical Group N.V., 100%)	Volte Grande Mine, Nazareno, Minas Gerais State	25 (concentrate).
Tin do.	Estanho de Rondônia S.A. (Companhia Siderúrgica Nacional, 100%)	Santa Barbara (mine) and Ariquemes (smelter)	3,600 (concentrate).
Do. do.	Mineração Taboca S.A. (Minsur, 100%)	Pitinga Mine, Amazonas State and Fundicion de Pinpora, Sao Paulo State	5,000 (concentrate).

See footnotes at end of table.

TABLE 2—Continued
BRAZIL: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
METALS—Continued			
Titanium	Indústrias Nucleares do Brasil S/A	San Francisco de Itabapoana, Rio de Janeiro State	NA.
Do.	Millenium Inorganic Chemicals Mineração Ltda. (Cristal Global Group, 100%)	Mataraca, Paraiba State (mine)	4,200 (ore).
Do.	do.	Mataraca, Paraiba State (beneficiation plants)	120 (concentrate).
Zinc	Votorantim Metais Zinco S/A (Grupo Votorantim, 100%)	Vazante Mine, Minas Gerais State	165.
Do.	do.	Moro Agudo Mine, Paracatu, Minas Gerais State	38.
Do.	do.	Tres Marias, Minas Gerais State	180 (metal).
Do.	do.	Juiz de Fora, Minas Gerais State	95 (metal).
Zirconium	Indústrias Nucleares do Brasil S/A	San Francisco de Itabapoana, Rio de Janeiro State	NA.
Do.	Millenium Inorganic Chemicals Mineração Ltda. (Cristal Global Group, 100%)	Mataraca, Paraiba State (mine)	NA.
Do.	do.	Mataraca, Paraiba State (beneficiation plants)	NA.
INDUSTRIAL MINERALS			
Asbestos	Sociedade Anônima Mineração de Amianto S.A. (Eternit Group, 100%)	Cana Brava Mine and plant, Minacu, Goias State	300 (concentrate).
Cement	Companhia de Cimento Itambé (private, 100%)	Itambe plant, Balsa Nova, Parana State	2,800.
Do.	Cimento Nacional (Brennand Group, 100%)	Sete Lagoas plant, Minas Gerais State	1,000.
Do.	Cimento Nassau (John Santos Group, 100%)	States of Amazonas, Ceara, Espirito Santo, Maranhao, Para, Piaui, Pernambuco, Rio Grande do Norte, and Sergipe (10 plants)	7,000.
Do.	Cimento Planalto S.A. (private, 100%)	Sobradinho, Brasilia, Distrito Federal State	1,600.
Do.	Cimento Tupi S.A. (private, 100%)	Carandai plant, Minas Gerais State; and Mogi das Cruzes, Sao Paulo State, and Volta, Redonda plant, Rio de Janeiro State;	3,500.
Do.	Holcim (Brasil) S.A. (Holcim Ltd., 100%)	Barroso, Cantagalo, Leopoldo, Sorocaba and Vitoria plants, Sao Paulo State	5,400.
Do.	InterCement Brasil S.A. (Camargo Correa S.A., 100%)	States of Alagoas, Bahia, Goias, Minas Gerais, Paraiba, Pernambuco, Sao Paulo, Mato Grosso do Sul, and Rio Grande do Sul (16 plants)	17,900.
Do.	Lafarge Brasil S.A. (Lafarge S.A. 99.76%)	States of Bahia, Goias, Minas Gerais, Paraiba, Rio de Janeiro, and Sao Paulo (9 plants)	7,100.
Do.	Mizu Cimentos Especiais (private, 100%)	States of Rio de Janeiro, Rio Grande do Norte, Espirito Santo, Sao Paulo, and Sergipe (6 plants)	3,000.
Do.	Votorantim Cimentos S.A. (Grupo Votorantim, 100%)	Cubatao, Ribeirao Grande, Salto de Pirapora, and Santa Helena plants Sao Paulo State Itau de Minas plant, Minas Gerais State Rio Branco do Sul plant, Parana State Laranjeiras plant, Sergipe State Candiota, Charqueadas, Esteio, and Pinheiro Machado plants, Rio Grande do Sul State Caucaia and Sobral plants, Ceara State Sobradinho plant, Distrito Federal State Edealina plant, Goias State Cuiaba and Nobres plants, Mato Grosso State Campo Grande and Corumba plants, Mato Grosso do Sul State Barcarena and Primavera plants, Para State Mineradora Ponta da Serra, Ouricuri, and Paulista plants, Pernambuco State Cantagalo, Sepetiba, Volta Redonda plants, Rio de Janeiro State Porto Velho plant, Rondonia State Capivari de Baixo, Imbituba, and Itajaí plants, Santa Catarina State Xambioa, Tocantins State	23,000 (combined).

See footnotes at end of table.

TABLE 2—Continued

BRAZIL: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
INDUSTRIAL MINERALS—Continued			
Fluorspar	Mineração Nossa Senhora do Carmo Ltda. (private, 100%)	Cerro Azul, Parana State (2 mines)	180 (ore).
Graphite	Extrativa Metalquimica S/A (private, 100%)	Maiquinique, Bahia State (mine)	2 (concentrate).
Do.	JMN Mineração S/A (private, 100%)	Mateus Leme, Minas Gerais State	2 (concentrate).
Do.	Nacional de Grafite Ltda. (private, 100%)	Itapecerica, Pedra Azul, Salto da Divisa, Minas Gerais State (3 mines and 3 beneficiation plants)	90 (concentrate).
Gypsum	Companhia Brasileira de Equipamento (private, 100%)	Codo, Maranhao State, and Ipubi, Pernambuco State (2 mines)	600 (ore).
Do.	Mineradora São Jorge S.A (private, 100%)	Araripe, Pernambuco State	800.
Do.	Votorantim Cimentos S.A. (Votorantim Group, 100%)	Mateo, Ceara State (mine)	NA.
Kaolin	Imerys Rio Capim Caulim S.A. (Imerys Group, 100%)	Ipixuna, Para State (2 mines)	NA.
Do.	do.	Barcarena, Para State (beneficiation plant)	NA.
Magnesite	Ibar Nordeste S.A. (private, 100%)	Brumado, Bahia State	NA.
Do.	Magnesita Refratários S.A. (private, 100%)	do.	1,200 (ore).
Do.	Xiolite S.A. (private, 100%)	do.	NA.
Phosphate rock	Copebrás S.A. (Anglo American plc, 100%)	Ouvidor, Goias State (mine)	1,350 (concentrate).
Do.	Vale Fertilizantes S.A. (Vale S.A., 100%)	Araxa, Patos de Minas, and Tapira Mines, Minas Gerais State	2,220.
Do.	do.	Catalao, Goias State	1,100.
Do.	do.	Cajati, Sao Paulo State	550.
Vermiculite	Brasil Minérios Ltda. (private, 100%)	Sao Luiz dos Montes Belos, Goias State	100 (concentrate).
MINERAL FUELS AND RELATED MATERIALS			
Coal	Carbonífera Circiuma S.A. (private, 100%)	Verdinho Mine, Forquilhinha, Santa Catarina State	2,800
Do.	Companhia Carbonífera Metropolitana S.A. (private, 100%)	Esperanca and Fontanella Mines, Santa Catarina State	1,200.
Do.	Copelmi Mineração Ltda. (private, 100%)	Butia, Cachoeira do Sul, and Charqueadas, Rio Grande do Sul State (4 mines)	3,000.
Do.	Indústria Carbonífera Rio Deserto Ltda. (private, 100%)	Circiuma and Urussanga, Santa Catarina State (2 mines)	2,600.
Natural gas thousand cubic meters	Petróleo Brasileiro S.A. (Petrobras) (Government, 81.4%; private, 11.8%; public, 6.8%)	Offshore and onshore fields in the States of Alagoas, Amazonas, Bahia, Ceara, Espirito Santo, Rio de Janeiro, Rio Grande do Norte, Sao Paulo, and Sergipe	28,200.
Petroleum thousand 42-gallon barrels	do.	Offshore and onshore fields in the States of Alagoas, Amazonas, Bahia, Ceara, Espirito Santo, Parana, Rio de Janeiro, Rio Grande do Norte, Sao Paulo, and Sergipe	740,000.
Petroleum products do.	do.	Refineries in the States of Amazonas, Bahia, Ceara, Minas Gerais, Parana, Rio de Janeiro, Rio Grande do Sul, and Sao Paulo	804,000.

[e] Estimated. Do., do. Ditto. NA Not available.

[1] Suspended.

TABLE 3
BRAZIL: RESERVES OF MAJOR MINERAL COMMODITIES IN 2013

(Thousand metric tons unless otherwise specified)

Commodity[1]		Reserves
Asbestos, fiber		10,167
Bauxite		714,000
Chromite, Cr_2O_3	metric tons	504,000
Coal, all types		3,285,000 [2]
Cobalt, metal content	metric tons	77,500
Copper, metal content		11,145
Fluorspar (CaF_2 content)		2,086
Gold, metal content	metric tons	2,400
Graphite		72,064
Gypsum		291,807
Iron ore		23,126,000
Kaolin		7,068,000
Lead, metal content	metric tons	163,000
Lithium, metal content	do.	48,000
Magnesite		235,400
Manganese, metal content		50,029,000
Natural gas	million cubic meters	458,163 [3]
Nickel, metal content		10,371
Niobium, metal content		10,694
Petroleum, crude	million 42-gallon barrels	15,593 [3]
Phosphate rock		315,000
Rare earths, metal content		22,000
Talc and pyrophyllite		44,010
Tantalum, metal content	metric tons	35,387
Tin, metal content	do.	441,917
Titanium minerals, TiO_2		2,600
Uranium, U_3O_8	metric tons	309,196 [2]
Vanadium, metal content	do.	175,000
Vermiculite		6,300
Zinc, metal content		1,783
Zirconium		2,566

do. Ditto.

[1] Source: Departamento Nacional de Produção Mineral, Summário Mineral 2014.

[2] Source: Empresa de Pesquisa Energética—Balanço Enegético Nacional 2014.

[3] Source: National Agency of Petroleum Natural Gas and Biofuels, Statistical Mineral Yearbook 2014.

THE MINERAL INDUSTRY OF CANADA

By Staff

Canada was one of the major mining countries in the world and ranked among the world's top five countries in the production of aluminum, mined cobalt, gem-quality diamond, indium, mined nickel, platinum-group metals ore, potash, and uranium ore (Bray, 2014; Jasinski, 2014; Kuck, 2014; Loferski, 2014; Olson, 2014; Shedd, 2014; Tolcin, 2014).

Minerals in the National Economy

Metals and industrial minerals were produced in all 10 Provinces and 3 Territories of Canada. Crude oil and natural gas were produced in the Provinces of Alberta, British Columbia, Manitoba, Newfoundland and Labrador, Nova Scotia, Ontario, and Saskatchewan, and in the Northwest Territories.

In 2013, Canada's real gross domestic product increased by 2.0% after increasing by 1.7% in 2012. All major industrial sectors registered growth in 2013 with the exception of the manufacturing sector. In 2013, the output value of the mining and mineral fuels sector increased by 5.6%, and that of the agriculture sector increased by 12.6%. Significant declines were recorded in the manufacturing of fabricated metal products and nonmetallic mineral products and as a result, the output value of the manufacturing sector decreased by 1.6% (Statistics Canada, 2014a).

Government Policies and Programs

In general, Provincial governments are responsible for mining activity within their respective Provinces. Provincial legislatures make laws concerning matters for which they have jurisdiction, which include exploration, development, production, and conservation and management of most nonrenewable natural resources. Parliament makes laws for the entire country with respect to matters assigned to it by Canada's Constitution, and it has responsibility for the Territories. The Federal Government is responsible for the mineral activities of Federal Crown corporations; mineral activities on Federal lands and offshore; and, through the Canadian Nuclear Safety Commission, for uranium exploration, development, production, and waste disposal. Local and municipal governments promulgate laws on local matters, such as zoning regulations and the issuance of construction permits. The outcome of 2004 SCC 73 {also known as Haida Nation v. British Columbia (Minister of Forests), [2004] 3 S.C.R. 511} held that the Federal and Provincial governments (the Crown) had a duty to consult with Aboriginal groups (First Nations, Inuit, and Métis) with claims to lands and Aboriginal rights, prior to taking action (such as awarding exploration and road-construction permits) that may adversely affect those interests.

The Canadian Securities Administrators' National Instrument 43–101 sets the standards for all technical public disclosure for mineral projects. National Instrument 51–101 sets the standards for disclosure for oil and gas activities.

Production

Canada was virtually self-sufficient in most mineral commodities. In general, the level of mineral and metal production was about the same in 2013 as it was in 2012. Mineral commodities for which reported production increased in 2013 included aluminum, mined cobalt, mined and refined copper, mined gold, iron ore, and platinum-group metals. Notable production decreases included those of mined bismuth, pig iron, mined lead, mined molybdenum, and mined zinc (table 1).

Structure of the Mineral Industry

Canada was one of the world's most active mining countries, and it had numerous mineral exploration, mine development, and mining projects underway. Canada's mineral industry is characterized by free enterprise in which private companies are involved in exploration, mine development, mineral production, mineral processing, and marketing. Table 2 lists the structure of Canada's mineral industry by principal mineral commodities and major operating companies.

Mineral Trade

In 2013, Canada's total domestic exports amounted to about $479 billion, which was about $16 billion more than that of 2012. Exports of crude petroleum were valued at $81 billion in 2013 compared with a revised $73 billion in 2012, exports of natural gas were valued at about $13 billion compared with a revised $11 billion in 2012, and exports of refined petroleum products were valued at $13 billion compared with a revised value of about $14 billion in 2012. In 2013, exports of intermediate metal products were valued at $43 billion, which was the same as in 2012; exports of industrial minerals were valued at about $9 billion compared with $10 billion in 2012; and exports of metal ores and concentrates were valued at about $9.4 billion compared with a revised $9.6 billion in 2012 (Statistics Canada, 2014b).

Canada's total domestic imports amounted to about $486 billion in 2013 compared with a revised $475 billion in 2012. Imports of intermediate metal products were valued at $24 billion in 2013 compared with $27 billion in 2012, and imports of metal ores and concentrates were valued at about $10.7 billion in 2013 compared with a revised $9.4 billion in 2012. Imports of crude petroleum were valued at about $26 billion in 2013 compared with a revised $31 billion in 2012, and imports of refined petroleum products were valued at about $11 billion compared with $10 billion in 2012 (Statistics Canada, 2014c).

Commodity Review

Additional information on other mineral commodities in Canada is available on the Web site for Natural Resources Canada's Canadian Minerals Yearbook at http://www.nrcan.gc.ca/mining-materials/markets/canadian-minerals-yearbook/8360.

Metals

Aluminum.—Production of primary aluminum increased by about 7% in 2013 to 2.97 million metric tons (Mt) compared with about 2.78 Mt in 2012. Rio Tinto Alcan Inc., which was a subsidiary of Rio Tinto plc, operated seven aluminum smelters with a total output capacity of 1.36 Mt and held shares in two aluminum operations, Becanclour and Sept-Iles (Alouette), in Canada. In 2011, the Board of Rio Tinto Alcan had approved an additional $2.7 billion to modernize the Kitimat smelter in British Columbia. The modernization would increase the output capacity to 420,000 metric tons per year (t/yr). Construction had begun, and the smelter was expected to become operational by midyear 2015. The smelter was designed to use AP40 smelting technology to operate at 400 kiloamperes (kA). The new prebaked smelter would replace the vertical stud Soderberg smelter built in 1954. The new smelter's capability to operate at higher amperage was expected to improve the facility's energy efficiency and labor productivity and reduce emissions and operating costs. Construction of Rio Tinto's 38-pot AP60 pilot plant at Saguenay-Lac-Saint-Jean, Quebec, was completed in December 2012. The 60,000-metric-ton-per-year-capacity smelter, which was designed to operate at 600 kA, started production in the third quarter of 2013. In November 2013, Rio Tinto shut down the Shawinigan aluminum operation in Quebec, which had been operating since 1942 (Rio Tinto Alcan Inc., 2014).

Orbite Aluminae Inc. (formerly Exploration Orbite VSPA Inc.) successfully completed the pilot-plant phase of its high-purity alumina (HPA) project at Cap-Chat, Quebec, and started commercial production. HPA is alumina with a grade of greater than 99.99% aluminum oxide (Al_2O_3). In December 2012, Orbite commissioned the HPA facility, and the plant produced 1 metric ton per day (t/d) of HPA in 2013. The company planned to increase the facility's output capacity to 3 t/d in 2015. Orbite's facility processed claystone and mudstone that were mined from the Grand-Vallee property, which was located about 100 kilometers (km) east of Cap-Chat. The HPA was expected to be used to produce industrial sapphire, which is a component of some types of light-emitting diodes. Orbite also planned to build a 540,000-metric-ton-per-year-capacity metallurgical-grade alumina plant at Cap-Chat. The metallurgical-grade alumina contained more than 99% Al_2O_3 by weight (Orbite Aluminae Inc., 2014).

Iron Ore.—Canada's production of iron ore was comparable in amount to that of Australia, Brazil, and China. The country's iron ore typically graded between 30% and 40% iron and required beneficiation to become a marketable product. Canadian iron ore producers used gravitational and magnetic concentration methods to produce concentrates with an iron content of about 65%. In Canada, ArcelorMittal Mines Canada Inc., Iron Ore Company of Canada (IOC), Cliffs Natural Resources Inc., Tata Steel Minerals Canada Ltd., and Wabush Mines Ltd. were major iron-ore-producing companies and accounted for more than 90% of the country's total output. With limited ironmaking capacity in the country, these companies exported more than 50% of their iron ore output to overseas markets (tables 1 and 2).

In 2011, IOC, which was a subsidiary of Rio Tinto plc, announced that the company planned to expand the concentrator capacity at its operation in Labrador City, Newfoundland. The first-phase expansion was completed in 2012, and the output capacity increased to 22 million metric tons per year (Mt/yr); the second-phase expansion was aimed at improving the magnetite recovery circuit and was completed in 2012. A third-phase expansion would increase the concentrator capacity to 30 Mt/yr; it was scheduled to be completed in 2015. The company planned to develop two new deposits (Wabush 3 and Wabush 6). The Wabush 3 deposit is located within IOC's existing property boundaries and had iron ore resources of 744 Mt (measured and indicated). The company planned to develop an open pit that would have an estimated operating life of about 45 years, depending on the mining rate. The environmental impact statement for the development of the Wabush 3 open pit mine had been submitted for review to the Department of Environment and Conservation (Iron Ore Company of Canada, 2014, p. 3).

Alderon Iron Ore Corp. announced that the Federal Government of Canada had approved the environmental impact statement report for the development of the Kami iron ore project in western Labrador. Alderon acquired a 100% interest in the Kami project from Altius Minerals Corp., and Altius retained a 3% gross sale royalty on iron ore from the Kami project. In 2013, China's Hebei Iron and Steel Group Co. acquired a 25% interest in the Kami Ltd. Partnership, which was established for the Kami project. Hebei Iron and Steel agreed to purchase 60% of the annual production of 8 Mt of iron ore concentrates at a price quoted in Platts Iron Ore Index. The Kami project had iron ore resources of 1.27 billion metric tons (Gt) (measured and indicated) at a grade of 29.6% iron. Alderon planned to begin the construction of an open pit mine and processing plant in 2015 that would produce 8 Mt/yr of iron ore concentrates containing 65% iron (Alderon Iron Ore Corp., 2014, 2015).

Nickel.—All nickel mines in Canada were sulfide-type deposits and the majority of nickel supply was from the Sudbury Basin. Vale Canada Ltd. (a subsidiary of Vale SA of Brazil) and Xstrata Nickel were the major nickel producers in Canada and accounted for more than 80% of the country's total output.

In 2006, Vale decided to invest $760 million to develop the Totten Mine, which was Vale's sixth mine in the Sudbury Basin; Totten is located in the Worthington region. The copper-nickel mine was explored by Inco Inc. in 1966 and had been kept on care-and-maintenance status since 1972; Vale gained control of the Totten Mine when it acquired Inco. Construction of the mine started in 2006 and it had been scheduled to reopen in 2011; however, owing to the global financial crisis of 2008 and 2009, Vale decided to delay opening the mine until February 2014. The mine had probable reserves of 7.89 Mt grading 2.07% copper, 1.47% nickel, and 0.04% cobalt, and it had a design capacity to produce 2,200 t/d of ore by 2016. The expected life of the Totten Mine was 20 years (Vale S.A., 2014).

Tungsten.—North American Tungsten Corporation Ltd. had two tungsten projects—Cantung and Mactung—in Yukon Territory. In 2013, the company milled about 364,700 t of ore and produced 287,000 t of tungsten concentrates at the Cantung Mine project. The level of operations at the Cantung Mine was similar in 2013 and 2012; however, the revenue decreased in 2013 because the average per ton salable price of tungsten decreased to $266 in 2013 from $367 in 2012. The company's mill enhancement project started in 2013 and was expected to be completed in 2014. The planned throughput capacity would increase by 20% and would both improve the recovery rate and enhance flotation circuit productivity. North American Tungsten continued a surface and underground drilling program to increase the mine's reserves and to extend the mine life beyond 2017. The Yukon Environmental and Socio-Economic Assessment Board issued its final screening report to allow the Mactung Mine project to proceed without further review. The Mactung property is located in the Selwyn Mountains Range and the area around Mount Allan. The company planned to design an underground mine to produce 2,000 t/d of ore; the ore would be processed by gravity and flotation processes to produce tungsten concentrates containing between 55% and 67% tungsten oxide. The mine had probable mineral reserves of 8.5 Mt grading 1.08% tungsten oxide. The company planned to produce 752,000 metric tons of tungsten oxide during the first 5 years of production (North American Tungsten Corporation Ltd., 2014, 2015).

Industrial Minerals

Diamond.—Canada's diamond production in 2013 was 10,560,000 carats, which was an increase from the 10,451,000 carats produced in 2012. The value of diamond produced in 2013 was $1.96 billion, which was slightly less than the value of about $2 billion in 2012 (Natural Resources Canada, 2013, 2014).

Canada's diamond was produced mainly in the Northwest Territories. Three major diamond producers—De Beers Canada Inc., Diavil Diamond Mines Inc., and Dominion Diamond Corp.—accounted for 90% of the country's total output. In April, BHP Billiton announced that the company had completed the sale agreement with Dominion Diamond Corp. (formerly Harry Winston Diamond Corp.) on the Ekati Mine in the Northwest Territories for $553 million. The Ekati Mine consisted of 282 mining leases that covered an area of 262,175 hectares. The area had 150 known kimberlites and had indicated mineral resources of 105.7 Mt containing an estimated 127.5 million carats of diamond (BHP Billiton plc, 2013a; Dominion Diamond Corp., 2013, p. 1).

Potash.—Canada was one of the leading potash-producing and exporting countries in the world. The majority of Canada's potash operations were located in the Province of Saskatchewan, and Potash Corporation of Saskatchewan Inc. (Potash Corp.) was the leading potash producer in Canada.

In 2013, BHP Billiton Canada decided to invest $2.6 billion to complete the excavation and lining of the production and service shafts at the Jansen potash project, which was located near Lanigan, Saskatchewan. The funding would also be used to install essential surface infrastructure and utilities. The mineral resource (measured and indicated) was estimated to be 5.3 Gt grading 25.7% potassium oxide, and the inferred resource was about 1.3 Gt grading 25.7% potassium oxide. The underground mine was designed to produce 10 Mt/yr of potash for more than 50 years (BHP Billiton plc, 2013b).

K+S Potash Canada General Partnership (K+S Potash Canada), which was a subsidiary of K+S Group of Germany, invested $4.1 billion to develop the Legacy potash mine and processing plant near Moose Jaw, Saskatchewan, in 2012. Construction of the mine continued in 2013 and was expected to be completed in 2016. The underground potash brine solution would be transported to the surface through two boreholes and then processed further. The processing plant was expected to reach full capacity of 2.86 Mt/yr by 2023. Further expansion to 4 Mt/yr of potassium chloride was expected after 10 years. The mine was designed to produce 2 Mt/yr of potash by the end of 2017 and to continue for 55 years (K+S Group, 2014).

Outlook

Canada's mineral industry is primarily export oriented, and the United States is the main destination for Canada's exported minerals. Canada's mineral sector continues to be challenged by globalization of the industry, especially by developing countries with mineral resources that are less costly to develop. Canada's mineral industry is well positioned to expand, based on its mineral resource base and its access to the markets of Asia (especially China and Japan), Europe, and North America.

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TABLE 1

CANADA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013[p]
METALS						
Aluminum:						
Alumina, aluminum oxide (Al_2O_3), smelter grade		1,125,000	1,301,000	1,363,000	1,397,000	1,333,000
Metal:						
Primary		3,030,269	2,963,210	2,987,964	2,780,556	2,969,364
Secondary[e]		40,000	40,000	50,000	40,000	40,000
Total[e]		3,070,000	3,000,000	3,040,000	2,820,000	3,010,000
Antimony[3]		64	--[r]	--[r]	--[r]	90
Bismuth:						
Mine output, Bi content[3, 4]		86	91	92	121	35
Metal, refined[e]		150	150	150	145	100
Cadmium:						
Mine output, Cd content[3]		376	2,796	1,766	290[r]	182
Metal, refined		1,299	1,357	1,240	1,286	1,313
Cobalt:						
Mine output, Co content[3, 5]		3,919	4,636	6,836	6,676[r]	6,916
Metal, refined		4,918	4,711	6,038	5,993[r]	4,789
Copper:						
Mine output, Cu content[3]		484,605	522,172	568,779	580,082[r]	631,856
Metal:						
Smelter:						
Primary, blister		316,510	318,006	304,724	287,051	254,509
Secondary		29,733	31,815	25,214	23,362	28,743
Total		346,243	349,821	329,938	310,413	283,252
Refined:						
Primary[e]		311,000	290,000	244,000	246,000	286,000
Secondary[e]		25,000	30,000	30,000	30,000	35,000
Total		335,896	319,619	273,761	275,990	321,511
Gold, mine output, Au content	kilograms	97,235	102,693	102,624	107,489[r]	125,853
Indium, metal[e]	do.	50,000	67,000	64,000	65,000	64,000
Iron and steel:						
Iron ore and concentrate:						
Gross weight	thousand metric tons	31,704	37,001	33,573	39,457	41,841
Fe content[e]	do.	20,000	23,300	21,000	25,000	26,000
Metal:						
Pig iron[6]	do.	5,000	7,666	7,323	7,654	6,100
Direct-reduced iron[6]	do.	300	600	702[r]	842[r]	1,250
Ferroalloys, electric arc furnace:[e]						
Ferrosilicon	do.	26	37	31	32	32
Silicon metal	do.	30	30	30	30	30
Ferroniobium	do.	7	7	8	8	8
Ferrovanadium	do.	1	1	1	1	1
Total	do.	90	90	70	71	71
Crude steel	do.	9,245	13,003	12,891	13,507	12,415
Lead:						
Mine output, Pb content		68,839	64,845	67,505	64,116[r]	20,188
Metal, refined:						
Primary		101,484	105,836	112,531	133,495	128,706
Secondary		157,370	167,101	170,059	141,966[r]	159,595
Total		258,854	272,937	282,589	275,461[r]	288,301
Molybdenum, mine output, Mo content		8,721	8,648	8,674	8,954[r]	7,955

See footnotes at end of table.

TABLE 1—Continued
CANADA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013[p]
METALS—Continued						
Nickel:						
Mine output, Ni content[3]		135,037	160,063	219,025	211,701 [r]	223,395
Refined[7]		116,909	105,413	142,445	139,800	137,410
Niobium (columbium) and tantalum:						
Pyrochlore concentrate:						
Gross weight[e]		12,900	13,200	13,800	14,000	16,000
Nb content of ferroniobium		4,330	4,419	4,632	4,707	5,300
Tantalite concentrate:						
Gross weight[e]		110	--	40	80	40
Ta content (Ta_2O_5)		30	--	10 [e]	20 [e]	10 [e]
Nb content		5	--	--	--	--
Platinum-group metals, mine output:						
Palladium[e]	kilograms	7,000	6,200	14,300	14,200 [r]	16,000
Platinum[e]	do.	4,000	3,500	8,000	8,500 [r]	9,200
Others (iridium/rhodium/ruthenium)[e]	do.	400	400	800	800 [r]	1,100
Total	do.	11,376	10,053	23,595	23,535 [r]	26,373
Selenium[8]	do.	173,000	79,000	35,000	144,000 [e]	150,000 [e]
Silver:						
Mine output, Ag content	do.	617,777	591,482	661,089	685,253 [r]	645,976
Refined	do.	1,287,659	1,640,612	1,555,855	1,675,998	1,745,638
Tellurium[4, 8]	do.	16,000	8,000	6,000	11	12
Titanium, Sorelslag®[e, 9]		765,000	1,090,000	878,000	900,000	900,000
Tungsten, mine output, W content[4]		1,964	420	2,368	2,194	2,128
Zinc:						
Mine output, Zn content		699,145	649,065	622,600	641,134 [r]	426,089
Metal, refined, primary		685,504	690,152	662,151	648,614	651,634
INDUSTRIAL MINERALS						
Asbestos[e]		150,000	100,000	50,000	--	--
Barite[4]		15,000	22,000	22,000	22,000	22,000
Cement, hydraulic	thousand metric tons	10,985	12,431	12,001	12,465	11,612
Clay and clay products[10]	value, thousands	$135,613	$156,554	$139,595	$135,921	$122,718
Diamond	thousand carats	10,946	11,773	10,795	10,451	10,560
Diatomite[e]		8,000	8,000	8,000	8,000	8,000
Gemstones, includes amethyst and jade		49	22	42	26 [e]	139
Graphite[e]		15,000	20,000	25,000	24,000	24,000
Gypsum and anhydrite[11]	thousand metric tons	3,540	2,717	2,555	1,832 [r]	1,819
Lime[4]	do.	1,601	1,913	1,959	1,964 [r]	1,856
Lithium, spodumene[e]		10,000	--	--	--	--
Magnesite, dolomite, brucite[e]		140,000	150,000	150,000	150,000	150,000
Mica, scrap and flake[e]		18,000	19,000	21,000	22,000	22,000
Nepheline syenite	thousand metric tons	513	581	610	592 [e]	674
Nitrogen, N content of ammonia		3,611,000	3,620,000	3,946,000	3,942,000	3,942,000
Peat	thousand metric tons	1,131	1,262	1,122	973 [e]	1,295
Phosphate rock, P_2O_5 content[e]	do.	200	210	200	200	200
Potash, K_2O equivalent	do.	4,318	9,788	11,055	8,984	10,211
Salt	do.	14,651	10,537	12,625	10,845	12,210
Sand and gravel:						
Construction	do.	216,170	205,804	206,974	225,208	225,208
Industrial (silica, quartz)[4, 11]	do.	1,296	1,171	1,431	1,593	1,593

See footnotes at end of table.

TABLE I—Continued
CANADA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013[p]
INDUSTRIAL MINERALS—Continued						
Sodium compounds, including sodium sulfate, natural[e, 12]	thousand metric tons	210	210	200	200	200
Stone[11, 13]	do.	135,895	147,643	167,716	151,838	152,512
Sulfur, byproduct:						
Metallurgy	do.	890	900 [e]	609	638	699
Petroleum	do.	6,577	6,355	5,914	5,545	5,666
Total	do.	7,467	7,260	6,523	6,183	6,365
Talc, pyrophyllite, soapstone[e]	do.	44	96	147	154	175
MINERAL FUELS AND RELATED MATERIALS						
Carbon black[e]		120,000	130,000	130,000	130,000	130,000
Coal, run of mine:						
Bituminous and subbituminous[e]	thousand metric tons	52,500	57,000	57,100	57,000	59,000
Lignite[e]	do.	10,400	11,000	10,000	10,000	10,000
Total	do.	62,935	67,876	67,114	66,563	68,908
Coke, high-temperature[e]	do.	2,800	3,000	3,050	3,100	3,050
Natural gas:						
Gross (excluding gas flared or recycled)	million cubic meters	196,168	189,589	188,849	185,000	185,000
Marketed	do.	145,133	144,378	145,285	141,274	141,396
Natural gas liquids:[e]						
Gas plant liquids	thousand 42-gallon barrels	174,000 [14]	168,000	172,000	170,000	170,000
Pentanes plus	do.	51,900 [14]	46,000	45,000	44,000	44,000
Condensate	do.	9,500 [14]	8,600	8,400	8,000	8,000
Total	do.	235,400 [14]	223,000	225,000	220,000	220,000
Petroleum:[e]						
Crude[15]	do.	933,000 [14]	990,000	1,050,000	1,190,000	1,260,000
Refinery products:						
Propane and butane	do.	20,400 [14]	21,600	20,300	18,000	18,000
Gasoline:						
Aviation	do.	550	500	400	300	300
Motor	do.	262,000	262,000	278,000	251,000	251,000
Petrochemical feedstocks	do.	20,000	34,000	28,000	30,000	30,000
Jet fuel	do.	30,000	30,000	37,000	28,000	28,000
Kerosene	do.	9,900	5,000	4,000	3,500	3,500
Diesel and light fuel oil	do.	220,000	225,000	210,000	230,000	230,000
Lubricants including grease	do.	7,000	7,200	6,900	8,100	8,100
Heavy fuel oil	do.	42,000	44,000	31,000	48,000	48,000
Asphalt	do.	25,000	27,000	26,000	27,000	27,000
Petroleum coke	do.	9,000	8,500	11,000	8,000	8,000
Other petroleum products	do.	35,000	34,000	19,000	26,000	26,000
Refinery fuel[16]	do.	36,000	35,000	31,000	27,000	27,000
Refinery gains and losses	do.	5,100	5,200	5,600	24,000	24,000
Total	do.	720,000	740,000	710,000	681,000	681,000
Uranium oxide, U content		10,176	9,518	9,145	8,985	7,889

[e] Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [p] Preliminary. [r] Revised. do. Ditto. -- Zero.

[1] Table includes data available through February 11, 2015.

[2] In addition to the commodities listed, aluminum hydroxide $Al(OH)_3$ (hydrate), cesium, ilmenite, ore containing indium, pumice, silicon metal, and zeolites are produced, but available information is inadequate to estimate output.

[3] Metal content of concentrates produced.

[4] Producers' shipments and quantities used by producers.

[5] Cobalt content of all products derived from Canadian ores, which include cobalt oxide shipped to the United Kingdom for further processing and nickel-cobalt matte shipped to Norway for refining.

[6] Source of iron and steel data: World Steel Association (Worldsteel).

[7] Nickel contained in products of smelters and refineries in forms that are ready for use by consumers. Natural Resources Canada has revised all refined nickel figures to conform with International Nickel Study Group (INSG) guidelines.

[8] Includes metal refined from imports and secondary sources. Also includes metal content of exported concentrates.

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[9] Refined Sorelslag® has been upgraded to 95% titanium oxide.

[10] Includes bentonite products from common clay, fire clay, stoneware clay, and other clays. Values are in current Canadian dollars. If necessary, values can be converted from Canadian dollars (CAN$) to U.S. dollars (US$) at an average rate of CAN$1.074=US$1.00.

[11] Shipments; excludes shipments to Canadian cement, clay, and lime plants.

[12] Excludes byproduct production from chemical plants.

[13] Crushed, building, ornamental, paving, and similar stone.

[14] Reported figure.

[15] Includes synthetic crude from oil shale and (or) tar sands.

[16] Represents total production of still gas, which includes a small amount sold.

TABLE 2
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina:			
Smelter grade	Rio Tinto Alcan Inc. (Rio Tinto Group, 100%)	Vaudreuil refinery, Jonquiere, Quebec	1,400.
Specialty grade	do.	do.	55.
Do.	Axens Canada Specialty Aluminas Inc. (Axens S.A., 100%)	Alumina plant, Brockville, Ontario	18.
Aluminum	Alcoa Ltd. (Alcoa Inc., 100%)	Smelter in Baie-Comeau, Quebec	385.
Do.	Aluminerie Alouette Inc. (Rio Tinto Alcan Inc., 40%; Aluminium Austria Metall Québec, 20%; Hydro Aluminum, 20%; Marubeni Québec Inc., 13.33%; Société générale de financement du Québec, 6.67%)	Smelter in Sept-Iles, Quebec	590.
Do.	Aluminerie de Bécancour Inc. (Alcoa Inc., 75%, and Rio Tinto Alcan Inc., 25%)	Smelter in Beacancour, Quebec	433.
Do.	Aluminerie Lauralco Inc. (Alcoa Inc., 100%)	Smelter in Deschambault, Quebec	260.
Do.	Rio Tinto Alcan Inc. (Rio Tinto Group, 100%)	Smelter in Alma, Quebec	438.
Do.	do.	Smelter in Arvida, Jonquiere, Quebec	176.
Do.	do.	Smelter in Grande-Baie, Quebec	224.
Do.	do.	Smelter in Kitimat, British Columbia	184.[2]
Do.	do.	Smelter in Laterriere, Quebec	239.
Do.	do.	Smelter in Shawinigan, Quebec	102.
Antimony:			
Ore	Xstrata Zinc	Brunswick Mine, about 25 kilometers southeast of Bathurst, New Brunswick[3]	NA.
Metal	do.	Belledune lead smelter, Belledune, New Brunswick	NA.
Asbestos, fiber	Jeffrey Mine Inc.	Jeffrey Mine,[3] Asbestos, Quebec	15.
Do.	LAB Chrysotile, Inc.	Lac d'Amiante Mine,[3] Thetford Mines, Quebec	160.
Bismuth:			
Ore	Xstrata Zinc	Brunswick Mine, about 25 kilometers southeast of Bathurst, New Brunswick[3]	NA.
Metal	do.	Belledune lead smelter, Belledune, New Brunswick	NA.
Do.	Teck Resources Ltd.	Trail smelter and refinery complex, Trail, British Columbia	300.
Cement	Ciment Québec Inc.	Saint-Basile, Quebec	1,571.
Do.	Colacem Canada Inc. (Colacem S.p.A.)	Grenville-sur-la-Rouge, Quebec	300.
Do.	ESSROC Canada Inc. (Italcementi Group)	Picton, Ontario	792.
Do.	Federal White Cement Ltd.	Woodstock, Ontario	544.
Do.	Holcim (Canada) Inc. (Holcim AG)	Joliette, Quebec	1,475.
Do.	do.	Mississauga, Ontario	2,000.
Do.	Lafarge Canada Inc. (Lafarge North America)	Bath, Ontario	1,176.
Do.	do.	Grinding plant, Stoney Creek, Ontario	814.
Do.	do.	Exshaw, Alberta	1,422.
Do.	do.	Kamloops, British Columbia	324.
Do.	do.	Richmond, British Columbia	1,319.
Do.	do.	St. Constant, Quebec	1,157.
Do.	do.	Brookfield, Nova Scotia	621.
Do.	Lehigh Inland Cement Ltd. (HeidelbergCement Group)	Edmonton, Alberta	1,380.
Do.	do.	Delta, British Columbia	1,356.
Do.	St. Marys Cement (Canada) Inc. (Votorantim Cimentos S.A.)	Bowmanville, Ontario	1,800.
Do.	do.	St. Marys, Ontario	645.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Coal:			
Bituminous:			
Coking	Grande Cache Coal Corp. (Marubeni Corp. and Winsway Coking Coal Holdings Ltd.)	Grande Cache Mine, near Grande Cache, Alberta	2,000.
Do.	Peace River Coal Limited Partnership (Anglo American plc, 100%)	Trend open pit mine, near Tumbler Ridge, British Columbia	2,000.
Do.	Teck Coal Partnership (Teck Resources Ltd., 100%)	Fording River open pit mine, near Elkford, British Columbia	8,900.
Do.	do.	The McLeod and the Prospect open pits, Cardinal River operations, near Hinton, Alberta	2,200.
Do.	do.	Coal Mountain open pit mine at Sparwood, British Columbia	2,700.
Do.	do.	Line Creek Mine, near Sparwood, British Columbia	3,200.
Do.	Teck Coal Partnership (Teck Resources Ltd., 95%; Nippon Steel Corp., 2.5%; POSCO Canada Ltd., 2.5%)	Elkview open pit mine, near Sparwood, British Columbia	6,000.
Do.	Teck Coal Partnership (Teck Resources Ltd., 80%, and POSCO Canada Ltd., 20%)	Greenhills open pit mine, near Elkford, British Columbia	5,100.
Do.	Western Canadian Coal Corp. (Walter Energy, Inc.)	Wolverine Creek open pit mine, near Tumbler Ridge, British Columbia	3,000.
Do.	do.	Brule Mine, near Chetwynd, British Columbia	2,000.
Do.	do.	Willow Creek Mine,[3] 45 kilometers from Chetwynd, British Columbia	1,700.
Steam	Pioneer Coal Ltd.	Stellarton Mine, near Stellarton, Nova Scotia	NA.
Do.	Coal Valley Resources Inc. (Sherritt International Corp.)	Coal Valley Mine, near Edson, Alberta	3,600.
Do.	do.	Obed Mountain Mine, Alberta	1,000.
Do.	Quinsam Coal Corp. (Hillsborough Resources Ltd.)	Quinsam underground mine, near Campbell River, British Columbia	500.
Lignite	Prairie Mines & Royalty Ltd. (Sherritt International Corp.)	Boundary Dam open pit mine, near Estevan, Saskatchewan	6,500.
Do.	do.	Poplar River open pit mine, near Coronach, Saskatchewan	4,000.
Do.	do.	Bienfait open pit mine, near Bienfait, Saskatchewan	2,800.
Subbituminous	do.	Highvale open pit mine, near Seba Beach, Alberta	13,000.
Do.	do.	Genesee open pit mine, near Warburg, Alberta	5,600.
Do.	do.	Sheerness open pit mine, near Hanna, Alberta	4,000.
Do.	do.	Paintearth open pit mine, near Forestburg, Alberta	3,500.
Copper:			
Ore, Cu content	Agnico-Eagle Mines Ltd.	LaRonde Mine, about 650 kilometers northwest of Montreal, Quebec	4.
Do.	Copper Mountain Mining Corp., 75%, and Mitsubishi Materials Corp., 25%	Copper Mountain Mine, British Columbia	45.
Do.	Highland Valley Copper Partnership (Teck Resources Ltd., 97.5%, and Highmont Mining Co., 2.5%)	Highland Valley Copper Mine, Kamloops, British Columbia	190.
Do.	Huckleberry Mines Ltd. (Imperial Metals Corp., 50%, and consortium composed of Mitsubishi Materials Corp., Marubeni Corp., Dowa Metals & Mining Co., Ltd., and Furukawa Co., Ltd., 50%)	Huckleberry Mine, 123 kilometers southwest of Houston, British Columbia	39.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Copper—Continued:			
Ore, Cu content—Continued	HudBay Minerals Inc.	Trout Lake[3] and 777 Mines, Manitoba	57.
Do.	Mount Polley Mining Corp. (Imperial Metals Corp., 100%)	Mount Polley Mine at Williams Lake, British Columbia	18.
Do.	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	1.
Do.	Nyrstar NV	Langlois Mine, 313 kilometers northeast of Val-d'Or, Quebec	2.
Do.	do.	Myra Falls (Battle-Gap and H–W Mines), British Columbia	5.
Do.	Quadra FNX Mining Ltd.	Podolsky Mine, Ontario	13.
Do.	Capstone Mining Corp.	Minto Mine, Yukon	23.
Do.	Taseko Mines Ltd.	Gibraltar Mine, British Columbia	38.
Do.	Teck Resources Ltd.	Duck Pond Mine, about 100 kilometers southwest of Grand Falls-Windsor, Newfoundland and Labrador	15.
Do.	Vale Canada Ltd. (Vale S.A.)	Sudbury mines (includes the Coleman, Copper Cliff North, Copper Cliff South,[4] Creighton, Ellen, Garson, Gertrude,[3] Stobie and Totten Mines), Ontario	112.
Do.	Vale Newfoundland & Labrador Ltd. (Vale S.A.)	Voisey's Bay Mines (includes the Ovoid Mine), Newfoundland and Labrador	55.
Do.	Xstrata Nickel (Glencore Xstrata plc, 100%)	Kidd Creek Mine, about 20 kilometers north of Timmins, Ontario	53.
Do.	do.	Nickel Rim South Mine, Sudbury division, Sudbury, Ontario	39.
Do.	do.	Raglan Mine, Quebec	7.
Do.	Xstrata Zinc (Glencore Xstrata plc, 100%)	Brunswick Mine, 20 kilometers southwest of Bathurst, New Brunswick[3]	7.
Do.	do.	Perseverance Mine, near Matagami, Quebec	10.
Smelter:			
Anode	Xstrata Copper (Glencore Xstrata plc, 100%)	Horne smelter in Noranda, Quebec	194.
Nickel-copper matte	Vale Canada Ltd. (Vale S.A.)	Copper Cliff smelter in Sudbury, Ontario	500.
Do.	Xstrata Nickel (Glencore Xstrata plc, 100%)	Sudbury smelter, Ontario	131.
Refinery (Cu cathode)	Xstrata Copper (Glencore Xstrata plc, 100%)	CCR Refinery in Montreal-Est, Quebec	276.
Do.	Taseko Mines Ltd.	Gibraltar solvent extraction-electrowinning (SX–EW) facility, British Columbia	1.
Diamond carats	Diavik Diamond Mines Inc. (Rio Tinto plc, 60%, and and Dominion Diamond Corp., 40%)	Diavik open pit mine (includes the A154 North and the A154 South kimberlite pipes), northeast of Yellowknife region, Northwest Territories	11,900,000.
Do. do.	Core Zone Joint Venture [Dominion Diamond Corp., 80%; C. Fipke Holdings Ltd., 10%; other (individual), 10%]	Ekati Mine (includes the Koala and the Panda underground mines and the Beartooth, Fox, Koala, and Misery open pit mines) in the Lac de Gras region, Northwest Territories	4,600,000.
Do. do.	De Beers Canada Inc. (De Beers Group)	Snap Lake underground mine, 220 kilometers northeast of Yellowknife, Northwest Territories	1,400,000.
Do. do.	do.	Victor open pit mine, 90 kilometers west of Attawapiskat, Ontario	600,000.
Do. do.	Shear Diamonds Ltd.	Jericho Mine,[3] 430 kilometers northeast of Yellowknife, Nunavut Territory	500,000.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013[1]

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Gold, Au content of ore	kilograms	Agnico-Eagle Mines Ltd.	Goldex Mine, Val-d'Or, Quebec	5,000.
Do.	do.	do.	Lapa Mine, about 60 kilometers west of Val-d'Or, Quebec	4,000.
Do.	do.	do.	LaRonde Mine, about 60 kilometers west of Val-d'Or, Quebec	5,600.
Do.	do.	do.	Meadowbank Mine, about 70 kilometers north of Baker Lake, Nunavut Territory	10,000.
Do.	do.	QMX Gold Corp.	Lac Herbin Mine, about 10 kilometers northeast of Val-d'Or, Quebec	1,000.
Do.	do.	Anaconda Mining Inc.	Pine Cove Mine, near Baie Verte, Newfoundland and Labrador	500.
Do.	do.	Aurizon Mines Ltd.	Casa Berardi Mine, about 95 kilometers north of La Sarre, Quebec	5,000.
Do.	do.	Barkerville Gold Mines Ltd.	QR Mine, British Columbia	400.
Do.	do.	Barrick Gold Inc.	Hemlo operation, includes David Bell underground mine and Williams open pit and underground mine, about 350 kilometers east of Thunder Bay, Ontario	7,100.
Do.	do.	Brigus Gold Corp.	Black Fox Mine, about 75 kilometers east of Timmins, Ontario	2,800.
Do.	do.	Capstone Mining Corp.	Minto Mine, about 240 kilometers northwest of Whitehorse, Yukon Territory	650.
Do.	do.	7918534 Canada Inc. (Sigma-Lamaque complex in receivership)	Sigma-Lamaque complex[3] (includes the Sigma Mine and the Lamaque Mine), Val-d'Or, Quebec	1,000.
Do.	do.	Claude Resources Inc.	Seabee operations (includes the Seabee Deep and the Santoy 8 Mines), Laonil Lake, Saskatchewan	1,500.
Do.	do.	Goldcorp Inc.	Musselwhite Mine, 480 kilometers north of Thunder Bay, Ontario	8,100.
Do.	do.	do.	Porcupine Mine, Timmins, Ontario	10,000.
Do.	do.	do.	Red Lake Mine (includes Red Lake and the Campbell complexes), 180 kilometers north of Dryden, Ontario	26,000.
Do.	do.	Golden Band Resources Inc.	EP Mine and Roy Lloyd Mine, Saskatchewan	1,500.
Do.	do.	Huckleberry Mines Ltd. (Imperial Metals Corp., 50%, and a consortium consisting of Mitsubishi Materials Corp., Marubeni Corp., Dowa Metals & Mining Co., Ltd., and Furukawa Co., Ltd., 50%)	Huckleberry Mine, 123 kilometers southwest of Houston, British Columbia	110.
Do.	do.	Hudson Bay Mining and Smelting Company Ltd. (HudBay Minerals Inc., 100%)	777 and the Trout Lake[4] Mines, Flin Flon, Manitoba	1,400.
Do.	do.	do.	Chisel North[4] and the Lalor Mine, Snow Lake, Manitoba	170.
Do.	do.	IAMGOLD Corp.	Doyon division (includes the Doyon and the Mouska Mines), about 40 kilometers east of Rouyn-Noranda, Quebec	800.
Do.	do.	Kirkland Lake Gold Inc.	South Mine complex (Macassa Mine, Ontario)	2,400.
Do.	do.	Lake Shore Gold Corp.	Bell Creek Mine, northeast of Timmins, Ontario, and Timmins West Mine, 18 kilometers west of Timmins, Ontario	3,300.
Do.	do.	Metanor Resources Inc.	Bachelor Lake mine and mill (located about 225 kilometers northeast of Val-d'Or, Quebec)	1,000.
Do.	do.	Mount Polley Mining Corp. (Imperial Metals Corp.)	Mt. Polley Mine, 8 kilometers southwest of Likely, British Columbia	1,700.

See footnotes at end of table.

TABLE 2—Continued

CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013[1]

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Gold, Au content of ore—Continued	kilograms	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	700.
Do.	do.	do.	Sleeping Giant Mine,[4] about 80 kilometers north of Amos, Quebec	NA.
Do.	do.	NVI Mining Ltd. (Breakwater Resources Ltd.)	Myra Falls complex (Battle-Gap and H–W Mines), British Columbia	400.
Do.	do.	Osisko Mining Corp.	Canadian Malartic Mine, about 20 kilometers west of Val d'Or, Quebec	13,000.
Do.	do.	Quadra FNX Mining Ltd.	Levack complex (includes the McCreedy West Mine and Morrison deposit), near Levack, Ontario	100.
Do.	do.	do.	Podolsky Mine, Ontario	130.
Do.	do.	Richmont Mines Inc.	Beaufor Mine, about 21 kilometers northeast of Val-d'Or, Quebec	800.
Do.	do.	do.	Francoeur Mine,[4] Quebec	NA.
Do.	do.	do.	Island Gold Mine, near Dubreuilville, Ontario	1,600.
Do.	do.	San Gold Corp.	Hinge Mine and Rice Lake Mine, Manitoba	2,400.
Do.	do.	St. Andrew Goldfields Ltd.	Hislop Mine, Holloway Mine, and Holt Mine east of Timmins, Ontario	3,500.
Do.	do.	Vale Canada Ltd. (Vale S.A.)	Manitoba division (includes the Birchtree Mine and the Thompson Mine), Thompson, Manitoba	NA.
Do.	do.	do.	Ontario division, includes Garson Mine, Garson, Ontario; Coleman/McCreedy East Mine, near Levack, Ontario; and Stobie Mine, north of Sudbury, Ontario	NA.
Do.	do.	Wesdome Gold Mines Ltd.	Eagle River Mine, about 50 kilometers west of Wawa, Ontario	1,900.
Do.	do.	do.	Kiena Mine, about 10 kilometers west of Val-d'Or, Quebec	1,300.
Do.	do.	Xstrata Zinc (Glencore Xstrata plc, 100%)	Brunswick Mine, 20 kilometers southwest of Bathurst, New Brunswick[3]	NA.
Indium	metric tons	Teck Resources Ltd.	Trail smelter and refinery complex, British Columbia	70.
Iron and steel:				
Iron ore:				
Ore		ArcelorMittal Mines Canada Inc. (ArcelorMittal)	Fire Lake and Mont-Wright open pit mines, Quebec	19,300.
Do.		Iron Ore Company of Canada (Rio Tinto Ltd., 58.72%; Mitsubishi Corp., 26.18%; Labrador Iron Ore Royalty Income Fund, 15.1%)	Carol Lake open pit mine, Labrador City, Newfoundland and Labrador	22,000.
Do.		Cliffs Natural Resources Inc., 75%, and Wugang Canada Resources Investments Ltd., 25%	Bloom Lake Mine, near Fermont, Quebec	8,000.
Do.		Tata Steel Minerals Canada Ltd. (Tata Steel Ltd., 80%, and New Millenium Iron Corp., 20%)	Direct Shipping Ore Project, near Schefferville, Quebec	2,000.
Do.		Wabush Mines Ltd. (Cliffs Natural Resources Inc.)	Scully (Wabash) Mine, near Wabush, Newfoundland and Labrador	5,600.
Magnetite for coal washing		Craigmont Mines Joint Venture	Reprocessed tailings near Merritt, British Columbia	NA.
Pellets		ArcelorMittal Mines Canada Inc. (ArcelorMittal)	Pelleting plant, Port Cartier, Quebec	9,000.
Do.		Cliffs Natural Resources Inc.	Pelleting plant, Pointe Noire, Quebec	5,200.
Do.		Iron Ore Company of Canada (Rio Tinto Ltd., 58.72%; Mitsubishi Corp., 26.18%; Labrador Iron Ore Royalty Income Fund, 15.1%)	Pelleting plant, Labrador City, Newfoundland and Labrador	13,000.

See footnotes at end of table.

TABLE 2—Continued

CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Iron and steel–Continued:			
Steel, crude	AltaSteel Ltd. (Arrium Ltd.)	Edmonton, Alberta	320.
Do.	ArcelorMittal Dofasco Inc. (ArcelorMittal SA)	Hamilton, Ontario	4,100.
Do.	ArcelorMittal Montreal Inc. (ArcelorMittal SA)	Contrecoeur East and Contrecoeur West plants, Quebec	2,500.
Do.	Essar Steel Algoma Inc. (Essar Global Ltd.)	Sault Ste. Marie, Ontario	2,800.
Do.	Gerdau Steel North America Inc. (Gerdau S.A.)	Whitby, Ontario	790.
Do.	do.	Selkirk, Manitoba	430.
Do.	do.	Cambridge, Ontario	380.
Do.	Hamilton Speciality Bar (2007) Inc.	Hamilton, Ontario	360.
Do.	Ivaco Rolling Mills Inc.	L'Orignal, Ontario	450.
Do.	MMFX Steel of Canada Inc. (MMFX Technologies Corp.)	Welland, Ontario	120.
Do.	QIT-Fer et Titane Inc. (Rio Tinto Iron and Titanium Inc.)	Sorel, Quebec	500.
Do.	SSAB Svenskt Stål AB—IPSCO Division	Regina, Saskatchewan	1,500.
Do.	U.S. Steel Canada Inc. (United States Steel Corp.)	Lake Erie Works, Naticoke, Ontario	2,400.
Do.	do.	Hamilton Works,[4] Hamilton, Ontario	2,300.
Lead:			
Lead-zinc ore	Alexco Resources Corp.	Bellkeno Mine, Yukon	20.
Do.	Maple Minerals Corp.	Caribou underground mine,[4] 45 kilometers west of Bathurst, New Brunswick	700.
Do.	ScoZinc Ltd. (Selwyn Resources Ltd.)	Scotia open pit mine,[4] Gays River, Nova Scotia	600.
Do.	Xstrata Zinc Canada (Glencore Xstrata plc, 100%)	Brunswick Mine in Bathurst, New Brunswick	3,550.
Refined:			
Primary	Teck Resources Ltd.	Trail Operations (smelter and refinery complex), Trail, British Columbia	100.
Do.	Xstrata Zinc (Glencore Xstrata plc, 100%)	Belledune smelter and refinery, 35 kilometers north of Bathurst, New Brunswick	85.
Secondary, includes lead alloys	NovaPb Inc. (Newalta Corp.)	Ville Sainte Catherine, Quebec	100.
Do.	Tonolli Canada Ltd.	Mississauga, Ontario	35.
Do.	Metalex Products Ltd.	Richmond, British Columbia	8.
Molybdenum, ore, Mo content metric tons	Highland Valley Copper Partnership (Teck Resources Ltd., 97.5%, and Highmont Mining Co., 2.5%)	Highland Valley Copper Mine, Kamloops, British Columbia	3,600.
Do. do.	Huckleberry Mines Ltd. (Imperial Metals Corp., 50%, and a consortium composed of Mitsubishi Materials Corp., Marubeni Corp., Dowa Metals & Mining Co., Ltd., and Furukawa Co., Ltd., 50%)	Huckleberry Mine, 123 kilometers southwest of Houston, British Columbia	40.
Do. do.	FortyTwo Metals Inc. (Roca Mines Inc., 100%)	Max Mine,[3] about 60 kilometers southeast of Revelstoke, British Columbia	1,800.
Do. do.	Taseko Mines Ltd.	Gibraltar Mine, British Columbia	600.
Do. do.	Joint venture of Thompson Creek Metals Company Inc., 75%, and Sojitz Moly Resources, Inc., 25%	Endako Mine, near Fraser Lake, about 160 kilometers northwest of Prince George, British Columbia	5,200.
Nickel:			
Ore, Ni content	Crowflight Minerals Inc.	Bucko Lake Mine,[4] near Wabowden, Manitoba	2.
Do.	First Nickel Inc.	Lockerby Mine, Sudbury district, Ontario	2.
Do.	Liberty Mines Inc.	McWatters Mine,[4] about 30 kilometers southeast of Timmins, Ontario, and the Redstone Mine,[4] about 25 kilometers southeast of Timmins, Ontario	3.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Nickel–Continued:			
Ore, Ni content—Continued	Quadra FNX Mining Ltd.	Levack complex (includes the McCreedy West Mine and Morrison deposit), near Levack, Ontario	5.
Do.	do.	Podolsky Mine, Ontario	1.
Do.	Vale Canada Ltd. (Vale S.A.)	Sudbury mines (includes the Coleman, Copper Cliff North, Copper Cliff South,[4] Creighton, Ellen, Garson, Gertrude,[4] Stobie and Totten Mines), Ontario	106.
Do.	do.	Manitoba division (includes the Birchtree Mine and the Thompson Mine), Thompson, Manitoba	45.
Do.	Vale Newfoundland & Labrador Ltd. (Vale S.A.)	Voisey's Bay Mines (includes the Ovoid Mine), Newfoundland and Labrador	80.
Do.	Xstrata Nickel (Glencore Xstrata plc, 100%)	Raglan Mine in Ungave, Quebec	28.
Do.	do.	Fraser Mine and Nickel Rim South Mine in the Sudbury district, Ontario	20.
Smelter	Vale Canada Ltd. (Vale S.A.)	Smelter in Sudbury, Ontario	110 (Ni oxide).
Do.	do.	Smelter in Thompson, Manitoba	82 (Ni anode).
Do.	Xstrata Nickel (Glencore Xstrata plc, 100%)	Sudbury smelter in Sudbury, Ontario	131 (Cu-Ni matte).
Refinery	The Cobalt Refinery Company Inc. (Moa joint venture of General Nickel S.A., 50%, and Sherritt International Corp., 50%)	Refinery in Fort Saskatchewan, Alberta	35 (Ni briquets and powder); 4 (Co briquets and powder).
Do.	Vale Canada Ltd. (Vale S.A.)	Refinery in Sudbury, Ontario	57 (Ni pellets and powder).
Do.	do.	Refinery in Thompson, Manitoba	NA.
Niobium (columbium) metric tons	IAMGOLD Corp.	Niobec Mine, Chicoutimi, Quebec	4,600 (Nb content).
Petroleum, refinery products[5] barrels per day	Chevron Canada Ltd. (Chevron Corp., 100%)	Burnaby refinery, Burnaby, British Columbia	55,000.
Do. do.	Consumers' Co-operative Refineries Ltd. (Federated Co-operatives Ltd., 100%)	Regina, Saskatchewan	100,000.
Do. do.	Husky Energy Inc.	Prince George refinery, Prince George, British Columbia	10,000.
Do. do.	do.	Lloydminster asphalt refinery, Lloydminster, Alberta	25,000.
Do. do.	Imperial Oil Ltd. (Exxon Mobil Corp., 69.6%)	Dartmouth refinery, Halifax, Nova Scotia	82,000.
Do. do.	do.	Nanticoke refinery, 40 kilometers southwest of Hamilton, Ontario	112,000.
Do. do.	do.	Sarnia refinery, Sarnia, Ontario	121,000.
Do. do.	do.	Strathcona refinery, Edmonton, Alberta	187,000.
Do. do.	Irving Oil Ltd.	Irving refinery, Saint John, New Brunswick	250,000.
Do. do.	Moose Jaw Refinery (Gibson Energy ULC)	Moose Jaw asphalt refinery, Moose Jaw, Saskatchewan	4,100.
Do. do.	North Atlantic Refining Ltd. (Harvest Operations Corp.)	North Atlantic refinery, Come by Chance, Newfoundland and Labrador	115,000.
Do. do.	Nova Chemicals Corp.	Corunna petrochemical and refinery complex, Corunna, Ontario	80,000.
Do. do.	Shell Canada Ltd. (Royal Dutch Shell plc, 100%)	Scotford refinery, 40 kilometers northeast of Edmonton, Alberta	100,000.
Do. do.	do.	Sarnia manufacturing center (Corunna refinery), Sarnia, Ontario	72,000.
Do. do.	Suncor Energy Inc.	Edmonton refinery, Edmonton, Alberta	135,000.
Do. do.	do.	Montreal refinery, Montreal East, Quebec	129,800.
Do. do.	do.	Sarnia refinery, Sarnia, Ontario	85,000.
Do. do.	Ultramar Ltd. (Valero Energy Corp., 100%)	Jean Gaulin refinery, Levis, Quebec	265,000.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Potash (K_2O equivalent)	Agrium Products Inc.	Vanscoy, Saskatchewan	1,800.
Do.	Mosaic Potash Colonsay ULC (The Mosaic Co., 100%)	Colonsay, Saskatchewan	1,800.
Do.	Mosaic Potash Esterhazy Limited Partnership Ltd. [The Mosaic Co., 75%, and Potash Corp. of Saskatchewan Inc. (Potash Corp.), 25%]	Esterhazy, southeast Saskatchewan	5,300.
Do.	The Mosaic Co.	Belle Plaine, Saskatchewan	2,800.
Do.	Potash Corp. of Saskatchewan Inc. (Potash Corp.)	Lanigan, near Lanigan, Saskatchewan	3,900.
Do.	do.	Rocanville, southeast Saskatchewan	3,100.
Do.	do.	Allan division, Allan, Saskatchewan	1,900.
Do.	do.	Cory, near Saskatoon, Saskatchewan	1,400.
Do.	do.	Patience Lake, near Saskatoon, Saskatchewan	1,100.
Do.	do.	Sussex, New Brunswick	800.
Salt:			
Rock salt and brine operations	Canadian Salt Co. Ltd.	Rock salt mine at Ojibway, Ontario, and brine wells near Windsor, Ontario	2,600.
Do.	do.	Pugwash, Nova Scotia	1,400.
Do.	Potash Corp. of Saskatchewan Inc. (Potash Corp.)	Sussex, New Brunswick	700.
Rock salt	Sifco Canada Inc. (Compass Minerals Group Inc.)	Goderich Harbour, Ontario	6,500.
Do.	Seleine Mines Division of Canadian Salt Co. Ltd.	Iles-de-la-Magdalen, Quebec	1,625.
Do.	Mosaic Potash Esterhazy Limited Partnership Ltd. [The Mosaic Co., 75%, and Potash Corp. of Saskatchewan Inc. (Potash Corp.), 25%]	Esterhazy, southeast Saskatchewan	NA.
Do.	NSC Minerals Inc.	Salt recovery from potash tailings at Rocanville and Vanscoy, Saskatchewan	NA.
Brine	Nexen Inc. and Albchem Industries Ltd.	Plant near Bruderheim, Alberta	NA.
Do.	Dow Chemical Canada Inc.	Fort Saskatchewan, Alberta	NA.
Do.	Junex Solnat (Junex Inc.)	Becancour, Quebec	NA.
Do.	Saskatoon Chemicals Holdings, Inc.	Plant near Saskatoon, Saskatchewan	NA.
Do.	Sifco Canada Inc. (Compass Minerals Group Inc.)	Amherst, Nova Scotia	NA.
Do.	do.	Plant near Unity, Saskatchewan	NA.
Do.	Canadian Salt Co. Ltd.	Belle Plaine, Saskatchewan	NA.
Do.	do.	Lindberg, Alberta	NA.
Silicon, metal	Québec Silicon Ltd. (Globe Speciality Metals Inc., 51%, and Dow Corning Corp., 49%	Plant at Becancour, Quebec	47.
Do.	Grupo FerroAtlántica S.A.	Plant[3] at Becancour, Quebec	4.
Tantalum, Ta_2O_5 content metric tons	Cabot Corp.	Tanco Mine, Bernic Lake, Manitoba	80.
Titanium, TiO_2 slag	Rio Tinto, QIT-Fer et Titane, Inc. (Rio Tinto Group, 100%)	Sorel-Tracy, Quebec	1,100 (Sorelslag®); 250 (UGS™ slag); NA (RTCS™ slag).
Tungsten, WO_3 content	North American Tungsten Corporation Ltd.	Cantung Mine, Northwest Territories	3,500.
Uranium, oxide metric tons	Joint venture of Cameco Corp., 69.805%, and AREVA Resources Canada Inc., 30.195%	McArthur River Mine, Saskatchewan	8,500.
Do. do.	Joint venture of Cameco Corp., 83.33%, and AREVA Resources Canada Inc., 16.67%	Key Lake mill, Saskatchewan	6,300.[3]
Do. do.	Cameco Corp.	Rabbit Lake operations, includes Eagle Point underground mine and Rabbit Lake mill, Saskatchewan	5,500.
Do. do.	Joint venture of AREVA Resources Canada Inc., 70%; Denison Mines Inc., 22.5%; OURD Canada Company Ltd., 7.5%	McClean Lake Mine and mill,[4, 6] Saskatchewan	5,400.
Wollastonite	Canadian Wollastonite (2005948 Ontario Ltd.)	St. Lawrence Mine, City of Kingston and the municipality of Leeds and the Thousand Islands, Ontario	NA.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Zeolites	HCA Mountain Minerals (Lethbridge) Ltd. (Heemskirk Canada Ltd.)	Processing plant at Lethbridge, Alberta	NA.
Do.	Heemskirk Canada Ltd. (Heemskirk Consolidated Ltd.)	Bromley Creek (Princeton) Mine, near Copper Mountain, British Columbia	NA.
Do.	do.	Z1 (Ranchlands) quarry, near Cache Creek, British Columbia	NA.
Do.	Industrial Mineral Processors Ltd.	Z2 quarry, near Cache Creek, British Columbia	NA.
Do.	do.	Processing plant at Ashcroft, British Columbia	NA.
Zinc:			
Lead-zinc ore	Agnico-Eagle Mines Ltd.	LaRonde Mine, 60 kilometers west of Val-d'Or, Quebec	55.
Do.	Maple Minerals Corp.	Caribou underground mine,[4] 45 kilometers west of Bathurst, New Brunswick	700.
Do.	ScoZinc Ltd. (Selwyn Resources Ltd.)	Scotia open pit mine[4] Gays River, Nova Scotia	600.
Do.	Trevali Mining Corp.	Halfmile Mine, New Brunswick	NA.
Do.	Xstrata Zinc Canada (Glencore Xstrata plc, 100%)	Brunswick Mine in Bathurst, New Brunswick[3]	3,550.
Do.	Yukon Zinc Corp. (Jinduicheng Molybdenum Group Company Ltd.)	Wolverine Mine, Yukon	80.
Zinc ore	Hudson Bay Mining and Smelting Co., Ltd. (HudBay Minerals Inc., 100%)	777 and Trout Lake[3] Mines, Flin Flon, Manitoba	2,300.
Do.	do.	Chisel North[3] and the Lalor Mines, Snow Lake, Manitoba	330.
Do.	Nyrstar NV	Langlois Mine, 313 kilometers northeast of Val-d'Or, Quebec	39.
Do.	do.	Myra Falls Mine, British Columbia	32.
Do.	Teck Resources Ltd.	Duck Pond Mine, 90 kilometers south of Buchans, Newfoundland and Labrador	640.
Do.	Xstrata Copper (Glencore Xstrata plc, 100%)	Kidd Creek underground mine, 25 kilometers north of Timmins, Ontario	2,350.
Do.	Xstrata Zinc (Glencore Xstrata plc, 100%)	Perseverance Mine, near Matagami, Quebec	1,100.
Refined	Canadian Electrolytic Zinc Ltd. (CEZinc) (Noranda Income Fund)	Hydrometallurgical plant at Salaberry-de-Valleyfield, Quebec	290.
Do.	Hudson Bay Mining and Smelting Co., Ltd. (HudBay Minerals Inc., 100%)	Zinc plant (pressure leach and electrowinning) at Flin Flon, Manitoba	115.
Do.	Teck Resources Ltd.	Trail Operations (smelter and refinery complex), Trail, British Columbia	295.

Do., do. Ditto. NA Not available.

[1] Abbreviations used in this table for commodities include the following: Au—gold; Co—cobalt; Cu—copper; K_2O—potassium oxide; Mo—molybdenum; Nb—niobium; Ni—nickel, Ta_2O_5—tantalum oxide, and TiO_2—titanium dioxide.

[2] Nameplate production capacity is 282,000 metric tons per year, but two potlines were closed in 2010 as part of the Kitimat modernization project.

[3] Closed in May 2013.

[4] Mine or facility closed or operations were suspended and placed on care-and-maintenance status.

[5] Does not include bitumen upgraders, which processed hydrocarbons from oil sands operations.

[6] Processes ore from the McArthur River Mine.

THE MINERAL INDUSTRIES OF CENTRAL AMERICA

BELIZE, COSTA RICA, EL SALVADOR, GUATEMALA, HONDURAS, NICARAGUA, AND PANAMA

By Susan Wacaster

Owing primarily to the expansion of the Panama Canal, the economy of Panama continued to lead economic growth in the Central America region. In 2013, the real gross domestic product (GDP) growth rate in the region remained positive but slowed in all countries except Guatemala; the year-on-year growth rate in Panama was 8.4%. Across the region, exports by the agriculture and manufacturing sectors decreased. A coffee plant disease had taken a major toll on coffee production and coffee exports throughout Central America, and the price and amount of most imports increased, particularly for energy and food (Central Bank of Belize, 2014, p. 6–7).

The mineral sector in Central America accounted for less than 1% of the GDP, on average, for the entire region from 2008 through 2012. Costa Rica reported the least amount of activity and Panama reported the greatest amount of activity during this 5-year period. In 2013, the value contributed to the GDP from mining and quarrying increased or stayed the same in all the countries of the region except Honduras (Comisión Económica para América Latina y el Caribe, 2014; González, 2014).

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BELIZE

Belize was not a globally or regionally significant mineral-producing country in 2013 nor was it prospective for nonfuel mineral commodity production in the near term. The year-on-year GDP growth rate was 1.6% in 2013 compared with a growth rate of 4.0% in 2012. Slow economic growth was attributable to decreased production in the agricultural, electricity generation, and petroleum sectors. Mining and quarrying accounted for no more than 0.5% of the country's GDP in every year from 1996 through 2013 and for no more than 0.6% in 1992 (the earliest year for which data were available) through 1995. Belize Natural Energy Ltd.'s petroleum production decreased by about 23% in the first half of 2013 compared with the same period in 2012 to 419,189 barrels owing to declining reserves (Comisión Económica para América Latina y el Caribe, 2014).

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COSTA RICA

Mining and quarrying remained insignificant to the national economy of Costa Rica. Mining and quarrying activities contributed 0.1% of Costa Rica's real GDP each year from 2009 through 2013. In 2013, the value contributed to real GDP by mining and quarrying was about $30 million compared with $29 million in 2012. In 2013, Costa Rica imported about $2.2 million worth of unspecified hydrocarbon products, which appeared to be the cost of crude petroleum imports (Banco Central de Costa Rica, 2014, p. 31; Comisión Económica para América Latina y el Caribe, 2014).

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EL SALVADOR

In 2013, El Salvador's year-on-year real GDP growth rate was about 1.7% compared with a revised 1.9% in 2012. The estimated value of production from mines and quarries was $50.1 million, which accounted for about 0.2% of the total GDP and was the same as revised values for 2012. In March 2012, Puma Energy International acquired 65% ownership in the Acajutla refinery, which the company was using for storage capacity. The two storage terminals at the facility had a combined volume of 293,200 cubic meters. Beginning in September 2012, El Salvador halted imports of crude petroleum and imported only refined petroleum products. The country exported about $129 million worth of fuels and lubricants in 2013 (Portillo, 2013; Comisión Económica para América Latina y el Caribe, 2014).

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GUATEMALA

In 2013, Guatemala's year-on-year real GDP growth rate was about 3.7% compared with 3.0% in 2012. The value contributed to the GDP from mining and quarrying activities in 2013 increased to about $426.1 million, or by 3.5% compared with that of 2012. Mining and quarrying activity accounted for about 0.9% of the GDP (Comisión Económica para América Latina y el Caribe, 2014).

Silver production increased by 38% in 2013 compared with that of 2012 owing to the startup of Tahoe Resources Inc. of Canada's Escobal Mine. The Escobal epithermal deposit is a fault-controlled epithermal vein system. The primary commodity at the Escobal Mine is silver followed by lesser amounts of gold, lead, and zinc. In 2013, Tahoe Resources processed 159,000 metric tons (t) of ore from which was produced 64,104 kilograms (kg) of silver, 865 t of zinc, 818 t of lead, and 60 kg of gold (Tahoe Resources Inc., 2014, p. 31).

Gold production from Goldcorp Inc. of Canada's Marlin Mine decreased to about 6,290 kg, or by by 2.4% compared with that of 2012, owing to the continued decrease in the millhead grade. Silver production, however, increased by 7.1% to about 219,100 kg owing to a 1% increase in the recovery rate (Goldcorp Inc., 2014, p. 45).

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HONDURAS

In 2013, the Honduran year-on-year real GDP growth rate was about 2.6% compared with a revised 3.9% in 2012. The value contributed to real GDP from mining and quarrying activities in 2013 decreased by 2.1% to about $42.8 million, which accounted for about 0.24% of the GDP (Comisión Económica para América Latina y el Caribe, 2014).

Gold production at Aura Minerals Inc. of Canada's San Andres Mine in 2013 increased to 1,985 kg, or by 6.8% compared with that of 2012. The production increase was attributed to the addition of a new secondary crusher at the mine's processing plant (Aura Minerals Inc., 2014).

Lead production at Nyrstar NV of Switzerland's El Mochito Mine decreased to 11,600 t, or by 6.5% compared with that of 2012. Zinc production decreased by 4% to 25,000 t, and silver production increased by 0.6% to 50,910 kg. Despite a 3.6% increase in ore production at El Mochito, total metal output decreased because of a decrease in the millhead grade (Nyrstar NV, 2014, p. 25).

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NICARAGUA

Nicaragua's year-on-year real GDP growth rate was 4.6% in 2013 compared with a revised 5.0% in 2012. The value contributed to the GDP from mining and quarrying activities increased by 21.7% to $117.9 million compared with a revised $96.9 million in 2012 and accounted for about 1.1% of the GDP (Comisión Económica para América Latina y el Caribe, 2014).

In 2013, gold production increased by 23.3% compared with that of 2012, and silver production increased by 34.6%. The increase in reported gold production was owing to a projected 2013 production total released by Hemco Nicaragua S.A. for the Rio Bambana gold mine. Silver production increased as a result of increased production at the Bonanza and La Libertad Mines (table 1).

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PANAMA

In 2013, Panama's real GDP growth rate was 8.4% compared with a revised 10.2% in 2012. The value contributed to the GDP from mining and quarrying activities increased by 31.4% to $399.7 million and accounted for 1.1% of the GDP compared with a revised $304.1 million and 0.9% of the GDP, respectively, in 2012. Sustained economic growth in Panama (the average GDP growth rate for 2011 through 2013 was 9.8%) was driven by its service-based economy, which was maintained by the country's construction industry, container ports, communications sector, international banking sector, the Panama Canal (and its expansion), ship registry services, real estate, and tourism. Since 2011, about 5% of world trade transited through the Panama Canal, and mineral commodities made up about 20% of the canal's traffic during that time (Mining Journal, 2013; Comisión Económica para América Latina y el Caribe, 2014).

Gold production decreased to about 2,099 kg in 2013, or by 0.8% compared with the output in 2012. All the gold output was from Petaquilla Minerals Ltd. of Canada's Molejon Mine, which was the only operating gold mine in Panama. Molejon was in its third year of commercial production (table 1).

Panama was expected to become a major copper-exporting country when First Quantum Minerals Ltd. of Canada's Cobre Panama project begins commercial production. In May 2013, First Quantum Minerals Ltd. (based in Vancouver, British Columbia) completed its acquisition of Toronto, Ontario-based Inmet Mining Corp.'s subsidiary FQM (Akubra) Inc., which owned an 80% share of the Cobre Panama property. The acquisition made First Quantum the majority owner and projected operator of the mine. The Cobre Panama project is expected to reach commercial production in the second half of 2017. The development timeframe and operating parameters for the Cobre Panama project were revised in 2013. The revised project would have an installed capacity of about 70 million metric tons per year (Mt/yr) of ore for the first 10 years with further expansion to 100 Mt/yr beyond the 10th year of operation. The project was expected to produce an average of about 320,000 metric tons per year (t/yr) of copper; 3,500 t/yr of molybdenum; 56,000 kilograms per year (kg/yr) of silver; and 3,100 kg/yr of gold during an estimated 34-year mine life. First Quantum expected to spend $600 million on development at Cobre Panama in 2014 as part of the total expected capital costs of $6.4 billion that would be required to bring the project into operation (Franco-Nevada Corp., 2014; Williams, 2014).

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TABLE 1
CENTRAL AMERICA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Country and commodity[2]		2009	2010	2011	2012	2013
BELIZE						
Petroleum, crude	thousand 42-gallon barrels	1,609	1,514	1,442	1,030	800 [e]
COSTA RICA						
Cement	thousand metric tons	2,100	1,500 [r]	1,400 [r]	1,400 [r]	1,500 [e]
Gold, mine output, Au content	kilograms	150	300	500	400	300
Iron and steel, semimanufactures[e]	thousand metric tons	319 [3]	400	400	400	400
Petroleum, refinery products	thousand 42-gallon barrels	17,062 [r]	17,904 [r]	18,545 [r]	18,249 [r]	19,016
Stone, sand and gravel:						
Crushed rock and rough stone[e]	thousand cubic meters	3,500	7,142 [3]	6,187 [3]	5,000	5,000
Limestone and calcareous materials	do.	1,500 [e]	900	1,500	2,284	2,000 [e]
Sand and gravel[e]	do.	3,500	2,667 [3]	3,476 [3]	3,000	3,000
Sandstone[e]	do.	150	124 [3]	122 [3]	125	125
EL SALVADOR						
Cement, hydraulic	thousand metric tons	1,212	1,290 [r]	1,320 [r]	1,380 [r]	1,400 [e]
Iron and steel, metal:						
Semimanufactures		69,000	78,000	97,000	100,000 [e]	100,000 [e]
Steel, crude		56,000	64,000	100,000	102,000	100,000 [e]
GUATEMALA						
Metals:						
Antimony, mine output, Sb content		--	--	--	62	67 [e]
Gold, mine output, Au content	kilograms	8,897	9,213	11,898	6,473	6,384
Iron and steel:						
Iron ore, gross weight		5,463	1,604	1,160	1,000	950 [e]
Semimanufactures[e]	do.	288 [3]	300	300	250	250
Steel, crude	thousand metric tons	224	274	445	334	320
Lead		--	--	--	2,300	2,100 [e]
Silver, mine output, Ag content	kilograms	129,280	194,683	272,771	204,555	283,204
Zinc, run of mine, Zn content		--	--	--	--	1,221
Industrial minerals:						
Cement, hydraulic	thousand metric tons	1,500	2,794 [r]	2,850 [r]	2,880 [r]	3,000 [e]
Clays:						
Bentonite		14,284	22,423	44,463	13,200 [r]	40,522
Ferruginous (includes clay and sand)	thousand metric tons	219	201	152	150 [e]	150 [e]
Kaolin		1,879	2,143	4,057	1,866	2,953
Unspecified		40,029	41,123	41,198	66,392	78,978
Feldspar		5,762	402	2,890	19,356	19,611
Gypsum, crude	thousand metric tons	19	59	46	100 [r]	118
Jadeite		18	8	27	33	89
Magnesium compounds (magnesite)		17,247	--	311	27,132	17,200
Pumice (sand)	cubic meters	394,955 [r]	34,116 [r]	1,447,528 [r]	NA	90,701
Quartz		1,000 [r]	500 [r]	500 [r]	500 [r,e]	500 [e]
Salt[e]	thousand metric tons	50	50	50	60	60
Stone, sand and gravel:						
Sand and gravel, natural:						
Building (foundation) sand	thousand cubic meters	14	--	5	10	5
River sand and gravel	do.	174	88	81	261	50
Sand and gravel, common	do.	118	204	702	500 [e]	333
Silica sand		35,933	62,098	60,000 [e]	48,664	53,242
Stone dust	cubic meters	9,446	2,845	8,607	1,531	2,000 [e]
Volcanic ash and sand	thousand cubic meters	418	1,246	1,448	1,500 [e]	1,500 [e]
Stone, crude:						
Basalt	cubic meters	62,057 [r]	1,239,720 [r]	489,845 [r]	35,959 [r]	52,756
Basaltic andesite	do.	56,534	1,155,959	1,051,132	1,007,465	1,247,957
Dolomite	do.	2,051	3,817	4,908	1,948	12,593

See footnotes at end of table.

TABLE 1—Continued
CENTRAL AMERICA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Country and commodity[2]		2009	2010	2011	2012	2013
GUATEMALA—Continued						
Industrial minerals—Continued:						
Stone, sand and gravel—Continued:						
Stone, crude—Continued:						
Flagstone, phyllite	cubic meters	86	67	410 [r]	230	193
Granite		1,584	336	161	1,667	1,275
Limestone, crude	cubic meters	1,687,542 [r]	1,888,573 [r]	1,900,000 [r, e]	1,888,259 [r]	1,786,337
Marble	do.	20,720	72,063	75,000 [r, e]	81,400 [r]	93,482
Marl[e]	do.	14,942 [3]	15,000 [r]	15,000 [r]	15,000 [r]	15,000
Schist	do.	173,955 [r]	148,628 [r]	180,553 [r]	185,688	182,652
Steatite		187	206	150 [e]	138	90
Talc		6,168	1,969	8,300	2,311	7,084
Tuff	cubic meters	39,222	184,541	126,138	58,656 [r]	163,638
Mineral fuels and related materials:						
Coal, lignite		--	2	--	2	1
Natural gas, gross[e]	thousand cubic meters	410 [3]	360 [3]	400	400	400
Petroleum:						
Crude	thousand 42-gallon barrels	4,933	4,363	3,995	3,876 [r]	3,645
Refinery products:						
Asphalt	42-gallon barrels	389,350 [r]	299,920 [r]	275,000 [r]	193,740 [r]	164
Diesel	do.	166,700 [r]	153,240 [r]	193,050 [r]	227,790 [r]	201,700
Kerosene	do.	7,850 [r]	3,240 [r]	7,130 [r]	2,880 [r]	2,910
Refinery gas	do.	15,830 [r]	15,900 [r]	36,510 [r]	32,670 [r]	18,180
Total	do.	580,320 [r]	472,300 [r]	511,690 [r]	457,260 [r]	222,954
HONDURAS						
Cement	thousand metric tons	1,800	1,600 [r]	1,620 [r]	1,730 [r]	1,700 [e]
Gold, mine output, Au content	kilograms	2,127	2,197	1,893	1,858	1,985
Lead, mine output, Pb content		14,471	16,944	16,954	12,400	11,600
Silver, mine output, Ag content	kilograms	57,697	58,158	53,167	50,605	50,910
Zinc, mine output, Zn content		36,370	33,839	26,000	26,000	25,000
NICARAGUA						
Cement	thousand metric tons	530	600	700	730	700 [e]
Gold, mine output, Au content	kilograms	2,590	4,900	6,395	6,981	8,610
Gypsum and anhydrite, crude		37,400	20,330	29,710	34,890	36,500
Lime		3,127	2,065	2,140	5,575 [r]	6,832
Pumice, stone	cubic meters	150	950	20	70	10
Sand, unspecified	thousand cubic meters	144	174	266	243	279
Silver, mine output, Ag content	kilograms	4,492	6,995	7,927	10,207	13,743
Stone:						
Crushed	thousand cubic meters	722	743	929	1,084	1,109
Quarried, unspecified	thousand metric tons	6,932	7,452	8,083	9,216	9,344
Tuff, volcanic	do.	118	134	117	142	186
PANAMA						
Cement	thousand metric tons	1,679	1,491 [r]	1,766 [r]	2,252 [r]	2,000 [e]
Gold, mine output, Au content	kilograms	800	870	1,675	2,115	2,099
Salt		19,552 [r]	27,592 [r]	16,580 [r]	15,607 [r]	15,000 [e]

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised. do. Ditto. NA Not available. -- Zero.

[1]Table includes data available through November 5, 2014.

[2]In addition to the commodities listed, additional cement, clay, construction materials, diatomite, dolomite, gold, gravel, limestone, marl, refinery products, sand, and semimanufactures are produced, but available information is inadequate to make reliable estimates of output.

[3]Reported figure.

TABLE 2
CENTRAL AMERICA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2013

(Thousand metric tons unless otherwise specified)

Country and commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity^e
BELIZE				
Petroleum	thousand 42-gallon barrels	Belize Natural Energy Ltd. (BNE), 100%	Spanish Lookout and Never Delay, Cayo District	1,000
COSTA RICA				
Cement, limestone, including marl		Holcim Costa Rica S.A. (Holcim Ltd., 59.8%, and other private, 40.2%)	Cartago cement plant, Aguas Calientes	1,200
Do.		CEMEX Costa Rica S.A. (CEMEX S.A.B de C.V., 98.7%, and other private, 1.3%)	Colorado de Abangares cement plant, Guancaste Province, and Guatuso de Patarra cement grinding and bagging plant, San Jose	900
Clays		do.	Tajo Finca clay quarry, near city of Platanar	100
Limestone		do.	Cerro Pena Blanca limestone quarry, Guancaste Province	300
Do.		Holcim Costa Rica S.A. (Holcim Ltd., 59.8%, and other private, 40.2%)	La Chilena and three other quarries near Cartago cement plant, Cartago Province	650
Petroleum, refinery products	thousand 42-gallon barrels	Refinadora Costarricense de Petróleo S.A. (RECOPE S.A.) (Government, 100%)	Moín refinery, city of Limon, Limon Province	18,000
Steel, semimanufactures		Laminadora Costarricense S.A. (Mittal Steel Company N.V., 50%, and Grupo Pujol-Martí, 50%)	Rolling mill, steel manufacturing complex, Guapiles, Jimenez de Pococi, Alajuela, y Tibas	450
EL SALVADOR				
Cement		Cemento de El Salvador S.A. de C.V. (Holcim Ltd., 64.25%, and other private, 35.75%)	El Ronco and Maya plants, near Metapan, Santa Ana Department	1,900
Limestone		do.	Quarries near Aldea El Zapote and Santa Ana, Santa Ana Department	440
Petroleum, refinery products	thousand 42-gallon barrels	Refinería Petrolera Acajutla S.A. de C.V. (RASA de C.V.) (Puma Energy International, 65%, and Royal Dutch/Shell Group, 35%)	Puerto de Acajutla, Sonsonate Department (storage facility)	8,000
Steel:				
Crude		Corporación Industrial Centroamericana S.A. de C.V. (private, 100%)	Electric arc furnace, Quetzaltepeque, La Libertad Department	60
Semimanufactures		do.	Billet casting machine and rolling mill, Quetzaltepeque, La Libertad Department	92
GUATEMALA				
Antimony	metric tons	Minas de Guatemala S.A. (private, 100%)	Clavito, La Florida, and Los Lirios Mines, Ixtahuacan, Huehuetenango Department	NA
Cement		Cementos Progreso S.A. (Grupo Cemcal SA Progresso, 100%)	San Miguel plant, Sanarate, El Progreso Department, and La Pedrera plant, Guatemala City	3,000
Gold	kilograms	Goldcorp Inc., 100%	Marlin Mine, near municipalities of San Miguel Ixtahuacan and Sipakapa, San Marcos Department	9,500
Lead, run of mine		Tenango Mining Company S.A., 100%	Caquipec Mine, Alta Verapaz Department	NA
		Tahoe Resources Inc. (100%)	Escobal Mine, Laguna de Ayarza	800
Lime		HORCALSA S.A. (Cementos Progreso S.A., 100%)	San Miguel plant, Sanarate, El Progreso Department	180
Petroleum, crude	thousand 42-gallon barrels	Perenco plc, 100%	Rubelsanto and West Chinaja fields, Alta Verapaz Department, and Caribe, Tierra Blanca, and Xan fields, Peten Department	6,000

See footnotes at end of table.

TABLE 2—Continued
CENTRAL AMERICA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2013

(Thousand metric tons unless otherwise specified)

Country and commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
GUATEMALA—Continued				
Silver	kilograms	Tahoe Resources Inc., 100%	Escobal Mine, Laguna de Ayarza	6,200
Steel:				
Crude		Siderúrgica de Guatemala S.A. (SIDEGUA) {Corporación Aceros de Guatemala S.A. [Corporación Centroamericana del Acero S.A. (Gerdau S.A., 30%, and other private, 70%), 100%], 100%}	Electric arc furnace, near city of Escuintla, Escuintla Department	500
Semimanufactures		Indeta S.A. (INDETA) {Corporación Aceros de Guatemala S.A. [Corporación Centroamericana del Acero S.A. (Gerdau S.A., 30%, and other private, 70%), 100%], 100%}	Rolling mill at Colonia San Ignacio, Mixco, near Guatemala City	250
Do.		Industria Galvanizadora, S.A. (INGASA) (Industrias Monterrey S.A. de C.V., 100%)	Plant near Guatemala City	74
Zinc	kilograms	Tahoe Resources Inc. (100%)	Escobal Mine, Laguna de Ayarza	6,200
HONDURAS				
Cement		Cementos del Norte S.A. de C.V. (Holcim Ltd., 24.2%, and Inversiones Continental S.A., 75.8%)	Rio Bijao plant, municipality of San Pedro Sula, Cortes Department	1,100
Do.		Cementos Argos SA de CV, 53.3%, and other private, 46.7%	Piedras Azules plant, municipality of Comayagua, Comayagua Department	1,300
Gold	kilograms	Aura Minerals Inc., 100%	San Andres Mine, municipality of La Union, Copan Department	3,300
Lead	metric tons	Nyrstar NV, 100%	El Mochito Mine, Santa Barbara Department, 90 kilometers south of San Pedro Sula	650
Silver	kilograms	do.	do.	650
Zinc	metric tons	do.	do.	650
NICARAGUA				
Cement		CEMEX Nicaragua S.A. (CEMEX S.A.B. de C.V., 100%, but on lease from Government)	San Rafael del Sur plant, 45 kilometers from Managua, and milling plant in Managua	600
Cement, clinker		Holcim de Nicaragua S.A. (Holcim Ltd., 70%, and other private, 30%)	Nagarote grinding plant, San Rafael del Sur	350
Gold	kilograms	B2 Gold Corp., 95%	El Limon Mine, Talavera deposit, 160 kilometers north of Managua	1,400
Do.	do.	B2 Gold Corp., 100%	La Libertad, 110 kilometers east of Managua	540
Do.		Hemco Nicaragua S.A.	Rio Bambana, Atlántico Norte	2,000
Petroleum, refinery products	thousand 42-gallon barrels	Refinería Esso Managua S.A. (Exxon Mobil Corp., 100%)	Managua, 64-kilometer pipeline to the refinery from Puerto Sandino	7,300
PANAMA				
Cement		Cemento Panamá S.A. (Cementos del Caribe S.A., 50%, and Holcim Ltd., 50%)	Grinding plant in Quebrancha, Panama Province	800
Do.		Cemento Bayano S.A. (CEMEX S.A.B. de C.V., 99.3%, and other private, 0.7%)	Plant in Calzada Larga, Panama Province	450
Gold	kilograms	Petaquilla Minerals Ltd., 100%	Molejon Mine, Panama Province	1,500

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

THE MINERAL INDUSTRY OF CHILE

By Susan Wacaster

Chile's position in the world's mineral economy was that of a leading supplier of many raw materials, especially metals associated with the mining of copper, and industrial minerals (such as lithium and potash) obtained from mining in the salars and arid areas in the country. In 2013, Chile remained the world's leading producer of copper, accounting for 31.8% of world mine production; iodine, 63.2%; rhenium, 50.9%; and lithium (Li content), about 38.6%. The country was estimated to have been the world's second-ranked producer of arsenic, accounting for an estimated 22% of world production; refined copper, 12.9%; and mined boron (ulexite), 9.2%. It was the world's third-ranked producer of molybdenum (13.5% of world production), the fifth-ranked producer of pumicite (5%), and the sixth-ranked producer of silver (mine output) (4.6%). Chile was estimated to have accounted for 3.2% of the world's mine output of potash [potassium oxide (K_2O equivalent)]; 3.0%, of salt [sodium chloride (NaCl)]; 2%, of gold; and 2.5%, of sulfur (table 1; Comisión Chilena del Cobre, 2014, p. 140; U.S. Geological Survey, 2014, p. 21, 33, 35, 67, 77, 95, 107, 123, 125, 131, 135, 147, 157).

Minerals in the National Economy

In 2013, the value of total mine production accounted for \$30.7 billion,[1] or 11.1% of the country's gross domestic product (GDP), compared with a revised \$33.2 billion, or 12.8% of the GDP, in 2012, which was a decrease of 13.3% in the mining sector's share of the GDP. The value of copper mine production alone accounted for \$26.8 billion compared with a revised \$29.5 billion in 2012. With a few notable exceptions, such as the prices of lead and tin, international prices for base and precious metals decreased in 2013. For example, the international price of scrap copper decreased by 24%; that of silver, by 24%; molybdenum (oxide), 19%; gold, 15%; refined copper, 7%; and zinc, 1.9%. Chile's production of zinc, molybdenum, and gold, however, increased in 2013 by 11.2%, 10.3%, and 2.8%, respectively, and production of refined copper and silver decreased by only 5.0% and 1.7%, respectively, which indicates that decreased international metals prices played a more significant role than did production amounts in the decreased contribution of mining to the GDP in 2013 (table 1; Comisión Chilena del Cobre, 2014, p. 151–152).

The mineral trade balance of Chile (including trade in crude petroleum and natural gas) decreased to \$32.7 billion from a revised balance of \$39.9 billion in 2012. The value of the country's exports of nonfuel mineral products decreased to \$41.4 billion from a revised value of \$48.3 billion in 2012; the value of the country's imports of coal, natural gas, and crude petroleum (85% of which was accounted for by crude petroleum) decreased by 14.9% to \$6.2 billion. The combined value of gas oil, diesel oil, and liquefied natural gas imports (82% of which was accounted for by gas and diesel oil compared with 75.8% in 2012) decreased by 15.5% to \$5.6 billion. Diesel oil and gas oil were the country's leading imports in terms of value, and the sum total of diesel oil, gas oil, and natural gas accounted for about 6% of total imports in 2012 and 2013. Chile's consumption of energy ranked fifth in South America, but the country was only a minor producer of mineral fuels and related materials. Thus, Chile was heavily dependent on imports of mineral fuels and related materials, and this had a strong negative effect on the country's mineral trade balance, although the country continued to have a trade surplus (U.S. Energy Information Administration, 2013; Banco Central de Chile, 2014, p. 32, 62, 64, 101).

Direct employment in the mineral sector in Chile, including coal and crude petroleum extraction, declined from an average level of 65,635 people in 1994 (the earliest year for which data were available), when it accounted for 2.3% of the employed population, to 48,734 people in 2004. Since 2004, employment in the mineral sector gradually increased, reaching 74,214 people in 2013 (for aggregate growth of 52.2%) compared with 71,279 in 2012. Of the total number of workers directly employed in mining and the extraction of crude petroleum in 2013, about 72% were employed in copper mining compared with a revised 71% in 2012. Based on data from Chile's National Institute of Statistics, the country's mining council estimated that the combined number of direct and indirect employees in the sector accounted for 12% of the total number of employees in Chile (Consejo Minero, 2013a, p. 26; Corporación Nacional del Cobre de Chile, 2014b, p. 71).

Government Policies and Programs

On June 16, 2005, the Government passed Law 20.026 to establish a mining-specific tax (royalty), which modified both the applicable Mining Code (Law 18.248, which was passed on September 26, 1983) and the 1974 foreign investment statute, known as Decree Law 600 (D.L. 600). The tax, which is assessed on a per-company basis, took effect at the beginning of 2006 and applies only if the total value of mine production by a single company in a given year exceeds the average value of 12,000 metric tons (t) of copper. The royalty rates that mining companies were estimated to have paid in 2010 were between 4% and 5%. On October 21, 2010, the Government enacted amendments to the mining royalty law to help finance reconstruction costs following an earthquake in northern Chile on February 27. In January 2011, it was estimated that between 80% and 90% of mining companies in the country had adopted the new tax scheme for earthquake reconstruction. Acceptance of the temporary earthquake-reconstruction tax by mining companies was voluntary, but the Government offered to extend existing tax-rate stability agreements (to be reinstated after 2012) for up to 6 years (until 2018) for those that adopted the new flexible-rate tax scheme. After the expiration of any tax-rate stability agreements, however, mining companies with annual sales that exceed the average value of 50,000 t of copper in a given year would pay a progressive mining-specific tax rate of between 5% and 14%. Before passage of the mining-specific tax law in 2005, the most recent significant modifications to the Mining Code had been through the approval of a Mining Safety Act on December 30, 2002 (Rojas and others, 2006, p. 360–362; Economist, The, 2010; Cambero and Soto, 2011; Trucco, 2011; Servicio de Impuestos Internos, 2011; Gravelle, 2012, p. 11–13; PKF International Ltd., 2012, p. 1; PricewaterhouseCoopers LLP, 2012, p. 11–13, 21; Antofogasta plc, 2013, p. 67).

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[1] Where necessary, nominal values have been converted from Chilean pesos (CLP) to U.S. dollars (US\$) at an annual average exchange rate of about CLP495.27=US\$1.00. All values are nominal, at current prices, unless otherwise noted.

The main environmental law, Law 19.300, was approved on March 9, 1994, and was supplemented on December 7, 2002, by Decreto Supremo 95, which requires environmental impact statements for any new investment projects that involve either exploration for or extraction of the country's natural resources (including minerals). In July 2011, the Chilean Congress approved Law 20.551 to regulate the closure and environmental remediation of mine sites and installations. On November 11, 2011, this new law was officially published, and it entered into force on November 11, 2012. On May 29, 2012, the Council of Ministers for Sustainability reportedly approved some text for new regulation of Chile's System for Evaluating Environmental Impacts (SEEI), but a new Government decree or law regarding regulation of the SEEI did not appear to have been published by yearend. On June 18, 2012, the Chilean Congress approved Law 20.600, which established three new environmental courts charged with the resolution of any complaints relating to emissions, decontamination plans, environmental damage remediation measures, and environmental disputes. The first of these new environmental courts was scheduled to open on December 28, 2012, and the other two were to open on June 28, 2013. On July 3, 2012, the Ministry of the Environment published a proposal for stricter limits on emissions of arsenic, mercury, particulates, and sulfur dioxide by current and future emission sources for which Government permits are issued, including copper smelters (Biblioteca del Congreso Nacional de Chile, 2008; Economist, The, 2010; Berner, 2012; Consejo Minero, 2012, p. 5, 16, 57–58; 2013b, p. 5, 50–55; Superneau, 2012; EcoMetales Ltd., 2013, p. 24–26).

In May 2013, the Council of Ministers for Sustainability at the Ministry of the Environment approved Agreement No. 8, which establishes standards for emissions from copper processing facilities by imposing requirements on existing and new emission sources. An emission source of arsenic is defined as a location where the thermal treatment of mineral or metallurgic compounds of copper or gold takes place and where arsenic content in the monthly feedstock is more than 0.005% by weight. For existing sources, limits were to be met within 5 years, or 3 years for facilities with double-contact sulfuric acid plants, and 2 years for other industrial emission sources of arsenic. Existing emission sources are required to capture 95% of their sulfur and arsenic emissions. For new emission sources, emissions are to be limited to 2% or less of the weight of the sulfur received by the new sources and 0.024% or less of the weight of the arsenic received. Under the agreement, maximum hourly stack emission rates are to be implemented for existing and new emission sources, and continuous emissions monitoring systems that are in accordance with U.S. Environmental Protection Agency standards are to be installed within 1 year of the date of publication of the new regulations (Beveridge & Diamond PC, 2013).

In 2006, the Government passed the Fiscal Responsibility Law (FRL), which created two funds to manage increased revenues from mining royalty payments and from the state-owned mining company Corporación Nacional del Cobre de Chile (CODELCO). The Economic and Social Stabilization Fund (ESSF) and the Pension Reserve Fund contained $15 billion and $5.9 billion in assets, respectively, at the end of 2012 compared with $13 billion and $4.4 billion, respectively, at yearend 2011 (International Monetary Fund, 2009, p. 60; Kumhof and Laxton, 2009, p. 25; Ministerio de Hacienda, 2013, p. 8).

The Government, through the Ministerio de Minería, exercises control of the mineral industry through three state-owned companies and four regulatory agencies. The state-owned companies that are significant to the mineral industry include CODELCO, some subsidiaries of Corporación de Fomento de la Producción (CORFO), and Empresa Nacional de Minería (ENAMI). The specific subsidiaries of CORFO that are significant to the mineral industry include Cía. Chilena de Electricidad S.A., Empresa Nacional del Carbón S.A. (ENACAR), and Empresa Nacional del Petróleo (ENAP). The four regulatory agencies are Comisión Chilena del Cobre (COCHILCO), Comisión Nacional del Medio Ambiente (CONAMA), Comité de Inversiones Extranjeras (CIE), and Servicio Nacional de Geologia y Minería (SERNAGEOMIN).

Production

In 2013, iodine production increased by 18%; lead (lead content of mine output), by 50.5%; molybdenum, by 10.3%; and zinc, by 11.2%. Coal production increased by 307%; crude steel and pig iron production decreased by 28.2% and 27.2%, respectively; and lithium hydroxide and lithium carbonate production decreased by 23% and 15.6%, respectively (table 1).

Structure of the Mineral Industry

In 2013, many of the world's leading private mining companies were invested in the mining sector of Chile. These companies included Anglo American plc and Antofagasta plc of the United Kingdom, Barrick Gold Corp. and Teck Cominco Ltd. of Canada, BHP Billiton Ltd. and BHP Billiton plc of Australia and the United Kingdom (BHP Billiton), Freeport-McMoRan Copper & Gold Inc. of the United States, K+S Aktiengesellschaft (K+S AG) of Germany, Rio Tinto Ltd. and Rio Tinto plc of Australia and the United Kingdom (Rio Tinto), and Glencore Xstrata plc of Switzerland (table 2).

The leading Chilean-owned companies in the mineral industry were Compañía Minera del Pacífico S.A. (CAP), CODELCO, Molibdenos y Metales S.A. (MOLYMET), and Sociedad Quimica y Minera de Chile S.A. (SQM). CAP, MOLYMET, and SQM were privately owned. CAP controlled most of the production of ferrous metals in the country; state-owned CODELCO was the leading copper mining company in the world; SQM was reportedly the leading producer of iodine, lithium carbonate, and potassium nitrate in the world; and MOLYMET was the world's leading processor of molybdenum and producer of rhenium (table 2; Compañía Minera del Pacífico S.A., 2013, p. 6, 28–29, 32–34; Corporación Nacional del Cobre de Chile, 2013, p. 9–14; Molibdenos y Metales S.A., 2013; Sociedad Química y Minera de Chile S.A., 2013, p. 18–22, 29).

Commodity Review

Metals

Copper and Molybdenum.—Copper production was conducted primarily in the Regions of Antofagasta (Region II), Atacama (Region III), Coquimbo (Region IV), Libertador General Bernardo O'Higgins (referred to by the short-form name "O'Higgins" hereafter) (Region VI), and Valparaiso (Region V). Large-scale operations included 19 private companies and CODELCO. Medium-scale operations, represented by 22 private companies, accounted for 5% to 6% of annual copper production, and small-scale operations accounted for about 2% of the national total (Servicio Nacional de Geología y Minería, 2014, p. 38–43).

In 2013, mine production from the large-scale companies and CODELCO was about 5.5 million metric tons (Mt), or 93.3% of the total. The Antofagasta region was the leading copper-producing region, accounting for between 52% and 57% of national production in every year since at least 2004 (Servicio Nacional de Geología y Minería, 2014, p. 38–43).

Mine production increased by 7.7% to almost 5.9 Mt. Minera Escondida Ltda.'s Escondida Mine, which was Chile's leading copper mine, produced 1.1 Mt of copper, or 19.2% of the national total, from 76.1 Mt of ore compared with 1.05 Mt of copper from 70.7 Mt of ore in 2012. Production from eight other copper mines, including Andina Division, Candelaria, Chuquicamata, Collahuasi, El Teniente, Los Bronces, Los Pelambres, and Radomiro Tomic accounted for 53% of Chile's copper production in 2013; copper production from these eight mines and Escondida accounted for 73% of mined copper production in 2013 (Corporación Nacional del Cobre, 2014b, p. 16).

Refined production from the Escondida Mine included 305,300 t of copper, 2,924 kilograms (kg) of gold, and 125,348 kg of silver compared with 310,300 t of copper, 3,048 kg of gold, and 108,862 kg of silver in 2012. Minera Escondida had maintained copper production capacity at the operation at between about 1.0 Mt and 1.1 Mt grading about 1.5% since 2009, but the mine had not produced to the level since 2007 when at maximum production the operation produced 1.6 Mt of copper from 90.7 Mt of ore with a millhead grade of 1.8% (Rio Tinto plc, 2014a, p. 213; 2014b, p. 3).

Minera Escondida expected to produce about the same amount of copper from the Escondida Mine in 2014 as in 2013. The primary reasons for the increased production at the Escondida Mine in 2012 and 2013 were the mining of higher grade ore following completion of the Escondida Ore Access project in June 2012, and somewhat to the addition of copper ore processing capacity provided by the completion of a debottlenecking project at the Laguna Seca concentration plant. In February 2012, BHP Billiton approved Organic Growth Project I (OGP 1) for the Escondida Mine. OGP 1 would replace Los Colorados concentration plant with a new one that would be located closer to higher grade ore and allow Minera Escondida to increase production of copper in concentrates to about 1.3 million metric tons per year (Mt/yr) of copper by sometime during the second half of 2014 (table 2; BHP Billiton Ltd., 2012, p. 48; 2013, p. 49; Comisión Chilena del Cobre, 2013, p. 17).

Chile's second-ranked copper mine in terms of production was CODELCO's wholly owned El Teniente Mine. El Teniente was the world's largest underground mine, and it produced 450,390 t of copper in 2013 compared with 417,244 t in 2012. During 2013, open pit mining operations began at a new sector of the mine called Rajo Sur, which was the first open pit extraction to have taken place at the mine in its 150-year history. Rajo Sur was expected to reach a maximum production rate of 56,000 metric tons per year (t/yr) of refined copper in its first year of operations and was expected to produce 232,000 t/yr of copper during an 8-year period (Corporación Nacional del Cobre de Chile, 2013, p. 92; 2014a; 2014c).

In 2013, the molybdenum content of mine output increased by 10.3% to 38,715 t. Molybdenum production was conducted primarily in the Regions of Antofagasta, Atacama, Coquimbo, O'Higgins, and Tarapaca (Region I) as a byproduct of large-scale copper production. The forms of molybdenum that were produced included concentrates and oxides, although molybdenum oxide accounted for just 1.03% of the total in 2013 (Servicio Nacional de Geología y Minería, 2014, p. 44–45).

Gold and Silver.—Gold production in Chile was conducted primarily in the Antofagasta, Atacama, and Coquimbo Regions. In 2013, 85.7% of the gold produced was sourced from these three Regions. The forms of gold that were produced were concentrates and dore, and just 39.5% of the gold produced in Chile in 2013 came from mines where gold was the primary commodity. The remainder came mostly from mines where copper was the primary commodity, but it came also from mines where silver or zinc were the primary commodity (Servicio Nacional de Geología y Minería, 2014, p. 45–50).

Gold production increased to 51,309 kg, or by 2.8% compared with that of 2012; this was a much lower increase than in 2012 and 2011, when year-on-year gold production increased by 10.6% and 14.3%, respectively. El Peñón was the leading gold-producing mine in 2013 and for each year since 2010. In 2013, the mine produced 10,519 kg of gold from 1.42 Mt of ore and accounted for 20% of the national gold output. The amount of ore processed in 2013 increased by just 0.5% compared with that processed in 2012, and gold production increased by 6.5%. The increase in gold production was owing to a 6.3% increase in the millhead grade despite a 0.5% decrease in the recovery rate. Production of silver at El Peñón decreased by 10.8% to 201,050 kg of silver owing to a 6.0% decrease in the millhead grade and a 4.3% decrease in the recovery rate, but the mine was still the leading silver producer in the country. Three other mines—Candelaria, Esperanza, and Maricunga—accounted for 31.9% of the gold produced in 2013, and production from these three mines plus El Peñón accounted for 52.4% of the national total (table 1; Servicio Nacional de Geología y Minería, 2014).

Barrick's wholly owned Pascua Lama project, which is located in Atacama Region and straddles the border with Argentina, continued to be held up by cost overruns, litigation, and protests. Total estimated reserves and resources at Pascua Lama as of yearend 2013 included more than 700,000 kg of contained gold. In November 2012, Chile's environmental evaluation department in Atacama fined Barrick for issues associated with the mitigation of dust, glacier monitoring, and wastewater management at Pascua Lama. The prestripping activities, combined with blasting and drilling at the project and emptying of material in the site's waste dump, were generating air-quality problems associated with the release of fine particulate matter and the complex climatic conditions at the high-altitude location in the Andes Mountains. Barrick was also facing charges from Chile's environmental supervision agency for violations of the project's environmental permits. In February 2013, amid the litigation in Chile regarding air-quality issues, an injunction against the company filed by five indigenous communities, and landslides in or near glacial and periglacial areas and waterways, an environmental audit by the San Juan Province in Argentina found that the mine project did not have any such adverse effect (Kosich, 2012).

In April 2013, a Chilean court ordered a suspension of activity at Pascua Lama in order to evaluate the claims against Barrick, and Barrick halted construction of the mine on April 10. In May, the Chilean Government fined Barrick $16 million for environmental violations. On July 15, 2013, a Chilean appeals court ordered that construction of the Pascua Lama project remain suspended until completion of the necessary infrastructure for a water management system that would meet the requirements of the previously granted environmental permits for the project. On September 25, Chile's Supreme Court upheld the suspension. Thus, Barrick amended the mine construction plan at Pascua Lama in order to complete the project's water management system by the end of 2014 before resuming other construction activities. Barrick expected Pascua Lama to begin production by about mid-2016 as opposed to its initial planned starting date of early 2013 (Ulmer and Cambero, 2013).

By early 2014, several Canadian law firms had initiated a class-action suit against Barrick. The suit alleged that the company had misrepresented the magnitude of the risk that investors faced when the company undertook construction of the project, the cost of which had increased to $8.5 billion from its original cost estimate of between $2.8 billion and $3.0 billion (Paddon, 2014).

On April 30, 2012, Chile's Supreme Court suspended a key environmental permit for the El Morro copper-gold project (70% owned by Goldcorp Inc. of Canada and 30% owned by New Gold Inc. of Canada), and Goldcorp halted construction activities at the project from April 27, 2012, through at least the first three quarters of 2013. Before the suspension, production at El Morro had been expected to begin sometime in 2017. In early November 2013, it was reported that Goldcorp had received approval of its environmental impact study, but by late November 2013, the project had been suspended again following a decision by a Chilean appeals court, which issued a stay on the approved environmental resolution of the project while it considered an appeal from a local indigenous community (Ulmer and Rocha, 2012; Goldcorp Inc., 2013, p. 6, 25, 29, 62–63; Mandalay Resources Corp., 2013, p. 4, 13–14; Ulmer, 2013).

Industrial Minerals

Lithium.—In 2013, Chile maintained its position as the world's leading lithium-producing country, and it also led the world in lithium reserves. The source of Chile's globally significant lithium reserves are the brine deposits and caliche ores contained, respectively, in the salars and arid areas of the Antofagasta Region. In 2013, SQM and Rockwood Lithium Ltda. accounted for approximately the entire production of lithium in Chile. SQM and Rockwood were, in fact, the only companies allowed to mine lithium deposits in Chile owing to regulations passed in 1986 that declared lithium to be a strategic mineral and lithium mining to be restricted to state-owned companies or companies that had been granted concessions before 1979 (Jamasmie, 2012; Servicio Nacional de Geología y Minería, 2014, p. 79; U.S. Geological Survey, 2014, p. 95).

As Chile's current copper reserves were being depleted and production was declining, the Government looked to lithium mining to help support the country's economy. The Government, therefore, took steps in 2012 to privatize lithium mining and reserves, including creating the Contrato Especial de Operacion de Litio (CEOL), or Special Contract for Lithium Operations, which involved the launch of tenders to exploit lithium concessions with 20-year contracts that would charge royalties of 7% of the annual sales of the raw material. The CEOL was enacted by a Presidential decree that bypassed the Congress, a move that led to public protests and heated debates about fast-tracking development of the lithium industry without first establishing a regulatory framework for the industry (Farinelli, 2012).

In October 2012, the first tender was awarded to SQM after it offered $40.8 million and outbid the next highest bidder, a Chilean, Korean, and Japanese consortium of companies that included Daewoo International Corp. and Posco Ltd. of the Republic of Korea, Mitsui & Co. Ltd. of Japan, and Minera Li Energy SpA, by more than $23 million. The large differences in the bids raised questions about a potential conflict of interest, as it was reported that the then vice-president of SQM had immediate family ties to leadership within the Ministry of Mines. Because of the potential conflict of interest, the tender was canceled. As part of a platform speech in October 2013, a candidate in the Presidential election recommended the creation of a committee to study the development of lithium mining, the creation of a national lithium policy, and increased Government support for mining agencies (Abarca, 2013).

Phosphate Rock.—In Chile, phosphate-bearing materials, including apatite, guano, and phosphorite were produced in Antofagasta, Atacama, Coquimbo and Trapaca. Production of phosphate rock increased by 40.3% in 2013 to 12,041 t (Servicio Nacional de Geología y Minería, 2014, p. 97–98).

In 2013, apatite production, which was carried out in Antofagasta and Coquimbo, increased by 40% compared with that of 2012. The primary use for apatite in Chile was for manufacturing bird food. Wide variations in the production volumes since 2008 may have been related to demand-based frequency of contracts for manufacturing bird food and (or) global shifts in supply and demand (table 1; Servicio Nacional de Geología y Minería, 2014, p. 97–98).

Phosphorite production data in Chile have been recorded only since 1998. In the mid-2000s, production was about 10,000 t/yr. In 2006, production decreased to 1,600 t owing to a near halt of operations at the only company that was producing the commodity, and production has varied greatly since that time. Phosphorite was produced only in Atacama, and no production was reported in 2013. Chile used its phosphorite for manufacturing a concentrated fertilizer that is applied in praderas, or grasslands (Servicio Nacional de Geología y Minería, 2014, p. 99).

Data have been available for guano production only since 2008. Prior to that time, the country's guano production data had not been recorded since 1992 when reported production was 139 t. Guano production was carried out in Tarapaca, and the average annual production volume from 2008 through 2013 was 1,865 t (Servicio Nacional de Geología y Minería, 2014, p. 99).

Mineral Fuels and Related Materials

Coal.—Until about 2011, Chile met its energy requirements primarily with hydropower and natural gas. Most (94%) of the country's relatively small coal demand was met by supplies from Australia, Colombia, Indonesia, and the United States. Coal demand was expected to increase to 25 Mt by 2030 compared with 10 Mt in 2012. Coal production in 2013 increased by more than 300% from 2012 to about 2.9 Mt (International Resource Journal, 2012).

Coal mining in Chile takes place in the Biobio Region (Region VIII) and the Magallanes y de la Antartica Chilena Region (Region XII), and is carried out at small-, medium-, and large-scale operations. Of the 2.9 Mt produced in 2013, about 2.5 Mt was produced at Mina Inviernos, which was one of three coal concessions on Isla Riesco. The coal mine was started up in 2013 and produced subbituminous coal from the Isla Riesco coal basin located north of the Strait of Magellan. The operator of the mine, Minera Isla Riesco, was a joint venture between Chilean energy company Empresas Copec S.A. and Ultramar Ltda., a Chilean shipping group. The production capacity at Mina Invierno was reported to be 4 to 6 Mt/yr in 2011. It was reported that Mina Inveirno would supply as much as 30% of the country's coal demand. Larger quantities of the low-grade subbituminous coal, which contained 0.4% sulfur, 21% ash, and 20% moisture content (Colombian coal contains about 7% sulfur), would be required to generate the energy that was produced from higher grade imports (International Resource Journal, 2012; Servicio Nacional de Geología y Minería, 2014, p. 112).

In 2013, about 300,000 t of coal from Mina Invierno was exported to India. The company reported that it planned to increase its exports to about 2 Mt/yr primarily to Asia and Europe, but without restrictions in terms of markets, and it planned to trade with as many countries as possible. It seemed that the strategy may be to defray energy costs by exporting low-grade coal to emerging markets while still importing and maintaining stocks of higher grade coal imports for domestic use (Platts.com, 2013).

Methanol and Natural Gas.—Natural gas production in Chile had decreased every year since 2005. The average annual rate of decrease for the period from 2005 through 2010 was 2.4%. By 2013, natural gas production decreased to 893 million cubic meters, or by 26% compared with decreases of 19.7% and 16.2% in 2011 and 2012, respectively. The lack of feedstock caused Methanex Corp. of Canada to idle its methanol production operations in March 2013. By September, however, the company restarted operations, but only at two of its plants (Servicio Nacional de Geología y Minería, 2014, p. 114).

In 2012, Methanex had begun the process of relocating two of four methanol plants, each with the capacity to produce 1 Mt/yr, to Geismar, Louisiana, from Cabo Negro, Chile. Combined, the four plants at Cabo Negro had a nameplate capacity to produce 3.8 Mt/yr of methanol. The two remaining plants were operating at just 32% of capacity.

Reserves and Resources

The estimates of mineral reserves in Chile in table 3 were compiled from company, Government, and other published sources. Table 3 includes reserve updates from SERNAGEOMIN for the metal content of copper and gold mine output, iodine, molybdenum, nitrates, and silver.

Reflecting the geographic distribution of the principal types of copper-bearing deposits and mineral districts in the country, approximately 47% of Chile's copper reserves are located in the Antofagasta Region, followed by the Regions of Tarapaca (16%), Valparaiso (12%), O'Higgins (11%), Atacama (7%), and Coquimbo (4%), and the Region Metropolitana (Santiago) (3%). SERNAGEOMIN's 13% increase in Chile's copper reserves to 209 Mt was owing to the inclusion of volumes of low-grade ores that were deemed exploitable after an increase in the price per pound of copper. The estimate of gold reserves in 2012 decreased by 1% to 2,642 t. SERNAGEOMIN's estimate of gold resources, however, increased by 12.2% to about 2,100 t as the price of gold had continued to increase since at least 2001, although not as dramatically between 2011 and 2012 as in previous years. All molybdenum produced in Chile was a byproduct of copper production from porphyry deposits. SERNAGEOMIN's molybdenum reserve estimate increased by 50% to 1.8 Mt and the resource estimate increased to 2.3 Mt, or by 21% compared with that of 2011. The molybdenum reserve estimate had increased each year since 2008 whereas the price of molybdenum had fluctuated (Servicio Nacional de Geología y Minería, 2014, p. 28–31).

Outlook

Chile, which had been the only nation outside of North America to consistently rank in the top 10 of the Fraser Institute's

Survey of Mining Companies, continued to decline in rankings in 2013. The Fraser Institute's global ranking of Chile as a desirable destination for investment by private companies in the mining and quarrying sector decreased to 23d from 18th out of 93 jurisdictions in February 2012, and to 8th out of 79 jurisdictions worldwide in March 2011. The Fraser Institute reported that Chile's decrease in the rankings was mostly owing to worsening perceptions by survey respondents in the following categories: the legal system; regulatory duplication and inconsistencies; and uncertainty regarding the administration, interpretation, or enforcement of existing regulations (Wilson, McMahon, and Cervantes, 2013).

In August 2013, the Government forecast that Chile's mining and quarrying sector could attract about $112 billion in investment during the following 8 years (until 2021). The expected investment in Chile's copper sector during this period could enable the country to remain the world's leading producer of copper, but Chile's share of global copper production could decrease to about 31% as Peru could narrow the gap in copper production. According to CODELCO, Chile's outlook for average global copper prices in 2014 is $3.15 per pound; the price was projected to decrease to $3.00 per pound in 2015 owing to an expected surplus of 416,000 t by 2015. The expected surplus would be a result of increased production in Chile as well as in Mexico, Peru, and Zambia. Chile's mined copper production in 2014 is expected to reach 6 Mt, which would be an increase of about 2.6%, and the increase is expected to come from output by CODELCO and privately owned mines, including Collahuasi. Chile's copper production is forecast to increase by an additional 2.4% in 2015 to 6.2 Mt (Henriquez, 2012; Vidal and González, 2012, p. 15–21, 30–29; 2013, p. 3, 6–8, 13, 21, 25, 42–43, 51–60; Mineweb.com, 2014).

In 2014, Chile's production of gold could decrease significantly, as increased production at El Peñón and the Minera Florida Mines is not expected to offset decreases in gold production at other mines, including copper mines. The earliest completion date for a large-scale gold mining project (projected to produce more than 10,000 kg/yr of gold) in Chile is expected to be at Barrick's Pascua Lama project in 2016, although the future of Pascua Lama remains unclear (BHP Billiton Ltd., 2013, p. 5–6; Comisión Chilena del Cobre de Chile, 2013; Yamana Gold Inc., 2013, p. 17–21).

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TABLE 1
CHILE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
METALS						
Arsenic trioxide[e, 3]		11,000	11,000	11,000	10,000	10,000
Copper:						
Mine output, Cu content[4]	thousand metric tons	5,394	5,419	5,263	5,434	5,851
Metal:						
Smelter, primary	do.	1,522	1,560	1,522	1,342	1,358
Refined:						
Electrowon	do.	2,118	2,089	2,025	2,029	1,933
Primary, other	do.	1,159	1,155	1,068	873	822
Total	do.	3,277	3,244	3,093	2,902	2,755
Gold, mine output, Au content	kilograms	40,834	39,494	45,137	49,936	51,309
Iron and steel:						
Ore and concentrate:						
Gross weight	thousand metric tons	11,215 [r]	12,624 [r]	17,330 [r]	17,109 [r]	17,000 [e]
Fe content	do.	6,805 [r]	7,747 [r]	9,429 [r]	9,088 [r]	9,000 [e]
Metal:						
Pig iron	do.	923	635	1,072	1,065	775
Ferroalloys:[e, 5]						
Ferrochromium		11	184	35	67	70
Ferromolybdenum		10,800	12,500	17,200	15,500	16,000
Steel, crude	thousand metric tons	1,308	1,011	1,615	1,671 [r]	1,200 [e]
Semimanufactures	do.	1,286	896	1,518	1,500 [e]	1,500
Lead, mine output, Pb content		1,511	695	841	410	617
Manganese ore and concentrate:						
Gross weight		5,722	--	--	--	--
Mn content		1,642	--	--	--	--
Mercury[e, 6]		88	176	90	52	50
Molybdenum, mine output, Mo content		34,925	37,186	40,889	35,090	38,715
Of which, oxides[7]		7,134	5,885	4,821	4,790	397
Rhenium, mine output, Re content[e, 8]	kilograms	25,000	25,000	24,000	24,000	25,000
Selenium[e]	do.	90,000	70,000	75,000	75,000	75,000
Silver:						
Mine output, Ag content		1,301	1,287	1,291	1,195	1,174
Metal, Ag content[9]	kilograms	195,375	150,060	165,550	165,000 [e]	154,500 [e]
Zinc, mine output, Zn content		27,801	27,662	36,602	26,762	29,759
INDUSTRIAL MINERALS						
Boron compounds:						
Boric acid (H_3BO_3)		95,677 [r]	105,190 [r]	102,323 [r]	97,235 [r]	91,252
Ulexite, natural		607,921	503,609	488,523	444,487	580,528
Cement, hydraulic	thousand metric tons	3,876	3,871	4,406	4,722	4,800 [e]
Clays:						
Bauxitic		69,634	29,832	38,312	4,976	2,145
Bentonite		--	--	1,255	893	358
Kaolin		48,354	62,226	59,912	60,429	60,000
Other, including ball and plastic clays		6,076	7,972	9,057	1,940	2,000 [e]
Copper sulfate		11,860	12,023	11,187	8,814	8,869
Diatomite		23,027	30,925	22,938	23,021	27,092
Dolomite		--	--	1,498	--	--
Feldspar		9,079	7,723	7,563	6,399	3,874
Gypsum:						
Crude		723,928	758,011	917,759	799,064	1,015,158
Calcined		196,043	183,919	185,576	124,154	117,598
Iodine, elemental		17,399	15,793	16,000 [e]	17,494	20,656
Lime, hydraulic[e]	thousand metric tons	790	890	860	970	1,000

See footnotes at end of table.

TABLE 1—Continued
CHILE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
INDUSTRIAL MINERALS—Continued						
Lithium compounds, natural:						
Lithium carbonate		25,154	44,025	59,933	62,002	52,358
Lithium chloride		2,397	3,725	3,864	4,145	4,091
Lithium hydroxide		2,987	5,101	5,800	5,447	4,197
Nitrates, crude, natural	thousand metric tons	1,049	1,059	928	823	760
Peat, horticultural use		768	1,343	958	346	527
Phosphatic materials, natural:						
Phosphate rock (apatite):						
Gross weight		10,584	9,019	14,304	8,585	12,041
P_2O_5 content[e]		3,260	2,780	4,410	2,650	3,740
Phosphorite		1,059	40,664	--	5,750	--
Guano		1,649	845	1,625	1,266	2,915
Potash, natural:						
Potassium chloride, KCl		942,309	1,523,222	1,328,504	1,581,226	1,838,735
Of which, K_2O equivalent[10]		595,300	962,200	839,200	998,900	1,158,000
Potassium sulfate, K_2SO_4		188,643	2,774	43,185	105,182	62,480
Of which, K_2O equivalent[e, 11]		96,000	1,400	22,000	54,000	51,000
Pumicite		919,249	824,049	816,565	826,779	800,031
Pyrophyllite		412	1,126	349	730	700 [e]
Salt (NaCl)	thousand metric tons	8,382	7,695	9,966	8,057	6,577
Siliceous sand and gravel (silica):						
Quartz, unspecified		601,344	501,534	422,468	359,692	360,293
Silica sand		803,177	824,759	814,375	907,784	997,855
Sodium compounds, n.e.s., sulfate[12]		112	60	--	--	--
Stone:						
Calcium carbonate, limestone	thousand metric tons	6,012	6,518	6,270	6,658	6,246
Of which:						
Coquina	do.	297	329	391	375	182
Ground calcium carbonate, white	do.	46	48	45	44	26
Limestone, crude	do.	5,670	6,141	5,834	6,238	6,246
Lapis lazuli		215	--	--	--	--
Marble		1,582	2,170	3,201	2,285	3,523
Travertine		5,473	4,015	4,117	4,467	5,599
Sulfur, byproduct[13]	thousand metric tons	1,658	1,686	1,723	1,681	1,700 [e]
Talc		790	238	--	--	--
Zeolites		--	--	94	250	159
MINERAL FUELS AND RELATED MATERIALS						
Coal, bituminous and lignite, marketable	thousand metric tons	636	619	654	712	2,902
Coke[e]	do.	450	350	560	580	600
Methanol	do.	942	935	554	313	204
Natural gas	million cubic meters	1,889	1,793	1,440	1,207	893
Petroleum:						
Crude and condensate[14]	thousand 42-gallon barrels	1,355	1,536	1,741	2,267	2,525
Refinery products:[15]						
Liquefied petroleum gas	do.	8,560	7,787	7,529	6,774	7,000
Gasoline, including for aviation	do.	21,121	17,549	18,957	19,379	19,000
Kerosene, including for jet fuel	do.	5,271	4,994	4,988	5,548	5,500
Diesel and distillate fuel oil	do.	25,751	21,738	23,694	21,436	21,400
Residual fuel oil	do.	11,177	9,202	8,737	8,020	8,000
Other, including asphalt, ethylene, naphtha, propylene, solvents, and so forth	do.	7,875	5,862	6,277	6,611	6,600
Total	do.	79,755	67,131	70,182	67,766	67,500

See footnotes at end of table.

TABLE 1—Continued

CHILE: PRODUCTION OF MINERAL COMMODITIES[1]

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[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1] Table includes data available through June 9, 2014.

[2] In addition to the commodities listed, pyrite is also produced, but available information is inadequate to make reliable estimates of output.

[3] Estimated arsenic trioxide equivalent of possible arsenic-containing residues and smelter dusts that might be recovered from nonferrous metals plants in Chile, although these residual materials may not have been processed to recover commercial-grade arsenic trioxide.

[4] Figures are the nonduplicate copper content of ore concentrates, blister, and refined copper measured at the last stage of commercial production, as reported by Comisión Chilena del Cobre (COCHILCO). Mine production reported by Servicio Nacional de Geología y Minería (SERNAGEOMIN) for the same years was only slightly higher (0.01% to 0.95%).

[5] Estimated from reported net exports.

[6] Data represent only U.S. imports from Chile. Source: U.S. International Trade Commission, Interactive Tariff and Trade DataWeb, Version 3.1.0.

[7] Production of molybdenum oxide only from the Chuquicamata and Radomiro Tomic Divisions of Corporación Nacional del Cobre de Chile (CODELCO).

[8] Data could include some estimated rhenium content from Belgium, Mexico, Peru, and the United States, processed in Chile.

[9] Production of refined silver metal (granular) only from the Ventanas smelter and refinery.

[10] Based on 63.17% potassium oxide equivalent for potassium chloride (sylvite) in Chile, as reported by SERNAGEOMIN, and rounded to four significant digits.

[11] Based on an assumed 51% potassium oxide equivalent for potassium sulfate, according to a minimum global average estimate and rounded to two significant digits. Source: Jasinski, S.M., 2014, Potash [advance release], *in* Metals and minerals: U.S. Geological Survey Minerals Yearbook 2012, v. I, p. 58.1–58.7.

[12] Not elsewhere specified; includes production of natural sodium sulfate and anhydrous sodium sulfate, which are coproducts of the nitrate industry (salitre).

[13] Sulfur content of sulfuric acid as a byproduct of metallurgy and processing of mineral fuels, as reported by COCHILCO.

[14] Includes natural gasoline.

[15] Includes production from both imported and domestic petroleum, as reported by Empresa Nacional del Petróleo (ENAP).

TABLE 2
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Arsenic (stabilized as nonhazardous waste)	EcoMetales Ltd. (Codelco Technologies Ltd., 100%)	Plant to remove the arsenic and antimony contained in smelting residues from the Chuquicamata Division, Antofagasta (Region II)	10
Barite metric tons	Sociedad Minera Godoy Schwenger y Cía.	Hijuelas, Valparaiso (Region V)	400
Bentonite do.	Sociedad Legal Minera Mabel Dos Primera de Arica	Quarry and plant near Arica, Arica y Parinacota (Region XV)	1,500
Boron compounds, B_2O_3 content	Química Industrial del Bórax Ltda. (private, Chile-based investors, 100%)	Ulexite mine at Salar del Surire, and boric acid and agrochemical plants near Arica, Arica y Parinacota (Region XV)	550
Do.	S.Q.M. Boratos S.C.M. [Sociedad Química y Minera de Chile S.A. (SQM), 100%]	Mine brines of Atacama Salar, and boric acid plant at Antofagasta, Region II	200
Do.	S.Q.M. Salar S.A. [Sociedad Química y Minera de Chile S.A. (SQM), 100%]	Plant in Santiago Metropolitan Region	NA
Calcium carbonate, natural	Minera El Way S.A. (Cementos Bío Bío S.A., 100%)	Quarry near Antofagasta, Region II	NA
Do.	Minera El Jilguero S.A. (Cementos Bío Bío S.A., 100%)	Quarry near Copiapo, Atacama (Region III)	NA
Do.	Minera Río Teno S.A. (Cementos Bío Bío S.A., 100%)	Quarry and plant at Teno, near Curico, Maule (Region VII)	NA
Do.	Minera Río Colorado S.A (Cementos Bío Bío S.A., 51%, and Soprocal Calerías e Industrias S.A., 49%)	La Perla Mine and plant near Melipilla, Santiago Metropolitan Region	NA
Do.	Sociedad Minera Las Abuelitas Ltda. (Soprocal Calerías e Industrias S.A., 100%)	Mine and plant near Melipilla, Santiago Metropolitan Region	NA
Do.	Minera Melón S.A. (Melón S.A., 100%)	Navío Mine near Quillota, Valparaiso (Region V)	NA
Do.	Alfredo Villalobos Román Tarsicio S.A.	Quarry and plant near Illapel, Coquimbo (Region IV)	NA
Do.	César B. Formas Ortiz S.A.	Plant at Chañaral, Atacama (Region III)	NA
Do.	Explotaciones de Minas Tongoy Ltda.	Quarry and plant near Tongoy, Coquimbo (Region IV)	NA
Do.	Imopac Ltda.	Plant at Vallenar, Atacama (Region III)	NA
Do.	Mario Alberto Pizarro A. S.A.	Plant at Los Vilos, Coquimbo (Region IV)	NA
Do.	Minera Trucco Ltda.	Mine and plant, Santiago Metropolitan Region	NA
Do.	Cristalerías Toro S.A.I.C.	Plant at Santiago, Santiago Metropolitan Region	NA
Do.	Sociedad Minera Godoy Schwenger y Cía.	Mine and plant near Quillota, Valparaiso (Region V)	NA
Do.	Compañía Minera Feltre Ltda.	Plant at Santiago, Santiago Metropolitan Region	NA
Do.	Compañía Minera Saturno Ltda.	do.	NA
Do.	Unimin Chile Ltda.	do.	NA
Do.	Sociedad Minera y Comercial Alegría y Cia Ltda.	Mine and plant at Coquimbo (Region IV)	NA
Do.	Sociedad Contractual Minera Pirineos	Quarry and plant at Vallenar, Atacama (Region III)	NA
Do.	Cemento Polpaico S.A. (Holcim Ltd., 54.3%; Compañía de Consumidores de Gas de Santiago, 40.9%; other, 4.8%)	Cerro Blanco plant, Santiago Metropolitan Region; Mejillones plant, Antofagasta (Region II); Coronel plant, Biobio (Region VIII)	NA
Cement	Melón S.A. (Inversiones Brescia S.A., 99.24%, and other private, 0.76%)	La Calera plant, Valparaiso (Region V), and grinding plant at Puerto Montt, Los Lagos (Region X)	1,800 [1]
Do.	Cementos Bío Bío S.A. (private, 100%)	Talcahuano plant, Biobio (Region VIII)	750 [1]
Do.	do.	Grinding plant at San Antonio, Valparaiso (Region V)	300 [1]
Do.	Industria Nacional de Cemento S.A. (INACESA), 100%	Plant near Antofagasta City, Antofagasta (Region II)	500 [1]
Do.	do.	Plant near Curico City, Maule (Region VII)	1,700 [1]
Clays, unspecified	Sociedad Minera Casablanca S.A.	Quarry and plant in Santiago Metropolitan Region	NA
Do.	Sociedad Minera Godoy Schwenger y Cía.	Quarry and plant near Quillota, Valparaiso (Region V)	NA
Do.	Minera Lealtad Ltda.	Quarry and plant at Til Til, Santiago Metropolitan Region, and at Olmue, Valparaiso (Region V)	NA
Coal, bituminous and lignite	Empresa Nacional del Carbón S.A. (ENACAR)	Trongol Mine near Curanilahue, and plant at Lota, Biobio (Region VIII)	NA
Do.	Carbonífera Victoria de Lebu S.A. (Empresa Nacional del Carbón S.A., 100%)	La Fortuna de Lebu Mine near Lebu, Biobio (Region VIII)	150

See footnotes at end of table.

TABLE 2—Continued
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Coal, bituminous and lignite—Continued	Ingeniería del Sur S.A.	Pecket deposit, Magallanes coal basin, Magallanes y de la Antartica Chilena (Region XII)	600
Do.	Minera Isla Riesco (Empresas Copec S.A. 50%, and Ultramar Shipping Co. 50%)	Mina Invierno, Isla Riesco coal basin, Magallanes y de la Antartica Chilena (Region XII)	5,000
Copper, Cu content	Compañía Minera Cerro Colorado Ltda. (BHP Billiton plc, 100%)	Cerro Colorado Mine and SX-EW[2] plant, Tarapaca (Region I)	120 [1]
Do.	Minera Escondida Ltda. (BHP Billiton plc, 57.5%; Rio Tinto plc, 30%; Japan Escondida Corp., 10%; International Finance Corp., 2.5%)	Escondida open pit mine, two concentrator plants, an oxide plant for cathode production (SX-EW[2]), and a sulfide-leach plant for cathode production, Antofagasta (Region II)	1,300
Do.	Minera Spence S.A. (BHP Billiton plc, 100%)	Spence Mine and SX-EW[2] plant, Antofagasta (Region II)	200 [1]
Do.	Compañía Minera Doña Inés de Collahuasi SCM (Anglo American plc, 44%; Glencore Xstrata plc, 44%; companies led by Mitsui & Co. Ltd., 12%)	Collahuasi open pit mine, concentration plant, and SX-EW[2] plant, at Ujina, Tarapaca (Region I)	400
Do.	Corporación Nacional del Cobre (CODELCO) (Government, 100%)	Chuquicamata Division, including Chuquicamata and Mina Sur Mines; Chuquicamata SX-EW[2] plant (oxide), smelter, and refinery (oxide and sulfide), Antofagasta (Region II)	450
Do.	do.	Radomiro Tomic Division and Mine, and Radomiro Tomic SX-EW[2] plant, Antofagasta (Region II)	480
Do.	do.	El Teniente Division and Mine, and Caletones smelter (anodes) and refinery (fire-refined ingots), Libertador General Bernardo O'Higgins (Region VI)	430
Do.	do.	Ventanas Division, Las Ventanas smelter and refinery (cathodes), Valparaiso (Region V)	402 [1]
Do.	do.	Andina Division, including Rio Blanco and Sur Sur Mines (concentrates), Valparaiso (Region V)	270
Do.	do.	El Salvador Division, including Campamento Antiguo and Damiana Norte open pit mines; Inca underground mine; and Potrerillos SX-EW2 plant and refinery, Atacama (Region III)	70
Do.	Minera Gaby S.p.A. [Corporación Nacional del Cobre (CODELCO) (Government, 100%), 100%]	Gabriela Mistral Mine and SX-EW[2] plant, Sierra Gorda, Antofagasta (Region II)	170 [1]
Do.	Compañía Minera Los Pelambres S.A. (Antofagasta plc, 60%, and a Japanese consortium, 40%)	Los Pelambres open pit mine and concentration plant, Coquimbo (Region IV)	430
Do.	Minera Esperanza S.A. (Antofagasta plc, 70%, and Marubeni Corp., 30%)	Esperanza sulfides mine and milling/flotation plant, Antofagasta (Region II)	175
Do.	Minera El Tesoro S.A. (Antofagasta plc, 70%, and Marubeni Corp., 30%)	El Tesoro open pit mine and SX-EW[2] plant, Antofagasta (Region II)	110
Do.	Minera Michilla S.A. (Antofagasta plc, 74.2%, and other private Chilean investors, 25.8%)	Michilla Mine and SX-EW[2]/sulfide-leaching plant, Antofagasta (Region II)	45
Do.	Empresa Nacional de Minería (ENAMI) (Government, 100%)	Hernán Videla Lira smelter (anodes and blister), Paipote, Atacama (Region III)	340
Do.	do.	Concentration plants: Manuel Antonio Matta, Paipote; Osvaldo Martínez, El Salado; and Vallenar, Atacama (Region III); and José Antonio Moreno, Taltal, Antofagasta (Region II)	180
Do.	Anglo American Sur S.A. (Anglo American plc, 50.1%; Mitsubishi Corp., 20.4%; Corporación Nacional del Cobre, 20%; and Mitsui & Co., Ltd., 9.5%)	Los Bronces Mine (concentrates) and Tortolas SX-EW[2] plant (cathodes), Santiago Metropolitan Region	450
Do.	do.	Chagres smelter (anodes and blister), Valparaiso (Region V)	175

See footnotes at end of table.

TABLE 2—Continued

CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Copper, Cu content—Continued		Anglo American Sur S.A. (Anglo American plc, 50.1%; Mitsubishi Corp., 20.4%; Corporación Nacional del Cobre, 20%; and Mitsui & Co., Ltd., 9.5%)	El Soldado Mine (cathode and concentrates), Valparaiso (Region V)	50
Do.		Empresa Minera de Mantos Blancos S.A. (Anglo American plc, 99.9%, and other private, 0.1%)	Mantos Blancos open pit mine and SX-EW[2] plant, Antofagasta (Region II)	100
Do.		do.	Mantoverde open pit mine and SX-EW[2] plant, Atacama (Region III)	65
Do.		Glencore Xstrata Copper Chile S.A.	Altonorte smelter (anodes and blister), La Negra, Antofagasta (Region II)	300 [1]
Do.		Compañía Minera Xstrata Lomas Bayas (Glencore Xstrata plc, 100%)	Lomas Bayas Mine and SX-EW[2] plant, Antofagasta (Region II)	75 [1]
Do.		Sociedad Contractual Minera El Abra [Freeport-McMoRan Copper & Gold Inc., 51%, and Corporación Nacional del Cobre (CODELCO) (Government, 100%), 49%]	El Abra Mine and SX-EW[2] plant, near Calama, Antofagasta (Region II)	225 [1]
Do.		Cía. Contractual Minera Candelaria (Freeport-McMoRan Copper & Gold Inc., 80%, and SMMA Candelaria Inc., 20%)	Candelaria open pit mine, underground mine, and concentration plant, near Copiapo, Atacama (Region III)	150
Do.		Cía. Contractual Minera Ojos del Salado (Freeport-McMoRan Copper & Gold Inc., 80%, and SMMA Candelaria Inc., 20%)	Ojos del Salado Mine and concentration plant, near Copiapo, Atacama (Region III)	35
Do.		Compañía Minera Zaldívar (Barrick Gold Corp., 100%)	Zaldívar open pit mine and SX-EW[2] plant, Antofagasta (Region II)	150
Do.		Compañía Minera Quebrada Blanca [Teck Cominco Ltd., 76.5%; Inversiones Mineras S.A., 13.5%; Empresa Nacional de Minería (ENAMI) (Government, 100%), 10%]	Quebrada Blanca open pit mine and SX-EW[2] plant, Tarapaca (Region I)	100
Do.		Minera Valle Central S.A. (Amerigo Resources Ltd., 100%)	Facilities near Rancagua, Libertador General Bernardo O'Higgins (Region VI), to process tailings of the Collahuasi and El Teniente Mines	30
Do.		Compañía Minera Carmen de Andacollo [Teck Cominco Ltd., 90%, and Empresa Nacional de Minería (ENAMI) (Government, 100%), 10%]	Carmen de Andacollo Mine and SX-EW[2] plant, Coquimbo (Region IV)	22
Do.		EcoMetales Ltd. (Codelco Technologies Ltd., 100%)	Plant to acid-leach fine copper at Chuquicamata Mine, produced by the Antofagasta (Region II) (from residual material Chuquicamata and El Teniente Divisions)	25
Copper sulfate	metric tons	Compañía Minera Cerro Negro	Portales Mine and a plant at Cabildo, Valparaiso (Region V)	200
Do.	do.	Minera Capacho Viejo Ltda.	Mine and plant near Tocopilla, Antofagasta (Region II)	5,000
Do.	do.	Compañía Minera San Gerónimo	Mine and plant near Coquimbo (Region IV)	10,000
Diatomite		Celite Chile Ltda. (IMERYS S.A., 100%)	Plant at Port of Arica, and mining operations nearby in Regions I and XV	30
Dolomite		Minera El Jilguero S.A. (Cementos Bío Bío S.A., 100%)	Quarries and plant near Copiapo, Atacama (Region III)	30
Feldspar		Minera Alfa Quintay Ltda.	Quarry and plant, Santiago Metropolitan Region	NA
Do.		J.B. Schiappacase A.	Quarry and plant near Limache, Valparaiso (Region V)	NA
Do.		Minera Pacífico Ltda.	Quarries and plants in Libertador General Bernardo O'Higgins (Region VI), and plant in Santiago Metropolitan Region	NA
Ferromolybdenum		Molibdenos y Metales S.A. (MOLYMET) (private, 100%)	Nos plant, San Bernardo, 30 kilometers south of Santiago, Santiago Metropolitan Region	25

See footnotes at end of table.

TABLE 2—Continued
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Gold:				
Metal ingots	kilograms	Corporación Nacional del Cobre (CODELCO) (Government, 100%)	Ventanas refinery, Valparaiso (Region V)	12,000 [1]
Mine output	do.	do.	Andina, Chuquicamata, El Teniente, Radomiro Tomic, and Salvador Divisions (byproduct of copper production)	2,000
Do.	do.	Minera Escondida Ltda., 100%	Escondida copper mine and plants, Antofagasta (Region II)	4,500
Do.	do.	Cía. Contractual Minera Candelaria, 100%	Candelaria copper mine and plant, Atacama (Region III)	2,500
Do.	do.	Cía. Contractual Minera Ojos del Salado, 100%	Ojos del Salado copper mine and plant, Atacama (Region III)	600
Do.	do.	Compañía Minera Los Pelambres S.A., 100%	Los Pelambres Mine and plant, Coquimbo (Region IV)	1,700
Do.	do.	Empresa Nacional de Minería (ENAMI) (Government, 100%)	Manuel Antonio Matta plant, Paipote; Osvaldo Martínez plant, El Salado; and Vallenar plant, Atacama (Region III); and José Antonio Moreno plant, Taltal, Antofagasta (Region II)	400
Do.	do.	Compañía Minera Doña Inés de Collahuasi SCM, 100%	Collahuasi Mine and plants, Tarapaca (Region I)	NA
Do.	do.	Compañía Minera Mantos de Oro (Kinross Gold Corp., 100%)	La Coipa Mine and plant, Atacama (Region III), 140 kilometers north of Copiapo	6,000
Do.	do.	Compañía Minera Maricunga (Kinross Gold Corp., 100%)	Maricunga open pit, heap-leach mine, Atacama (Region III), 100 kilometers east of Copiapo	7,500
Do.	do.	Minera Meridian Ltda. (Yamana Gold Inc., 100%)	El Peñón Mine and concentration plant, Antofagasta (Region II)	10,500
Do.	do.	Minera Esperanza S.A. (Antofagasta plc, 70%, and Marubeni Corp., 30%)	Esperanza sulfides mine and milling/flotation plant, Antofagasta (Region II)	8,000
Do.	do.	Minera Florida S.A. (Yamana Gold Inc., 100%)	Minera Florida Mine and concentration plant, Santiago Metropolitan Region	3,100
Do.	do.	Compañía Minera Cerro Bayo Ltda. (Mandalay Resources Corp., 100%)	Cerro Bayo Mine and concentration plant, Aysen (Region XI)	950
Do.	do.	Sociedad Contractual Minera El Toqui Ltda. (Nyrstar NV, 100%)	El Toqui Mine and Doña Rosa concentration plant, Aysen (Region XI), 120 kilometers north of Coyhaique	1,600
Gypsum, natural		Compañía Industrial El Volcán S.A. (Saint-Gobain Gypsum S.A., 100%)	El Volcan quarry near Santiago, Santiago Metropolitan Region	100
Do.		Compañía Minera Romeral S.A. (Etex Group S.A., 59.8%, and Melón S.A., 40.2%)	El Romeral quarry near Santiago, Santiago Metropolitan Region	50
Do.		Minera Lo Valdés Ltda.	Santiago Metropolitan Region	NA
Do.		Compañía Minera Polpaico Ltda.	Yeso Norte Mine, Antofagasta (Region II)	NA
Do.		Industria Nacional de Cemento S.A. (INACESA), 100%	Mantos verdes quarry near Antofagasta City, Antofagasta (Region II)	NA
Do.		Antonio Zotti Rosetti y Cía. Sociedad Minera	La Confianza and San Jose Mines near Los Vilos, Coquimbo (Region IV); Margarita and San Nicolas Mines, and a plant near Renca, Santiago Metropolitan Region	NA
Iodine	metric tons	SQM Químicos S.A. [Sociedad Química y Minera de Chile S.A. (SQM), 100%]	Nueva Victoria Mine and plant and Iris plant, Tarapaca (Region I); El Toco Mine and María Elena plant; and Pampa Blanca and Pedro de Valdivia Mines and plants, Antofagasta (Region II)	12,500 [1]
Do.	do.	Atacama Chemical S.A. (Cosayach) (Inverraz S.A., 100%)	Mine and plant near Iquique, Tarapaca (Region I)	3,000
Do.	do.	Atacama Minerals Chile Sociedad Contractual Minera (Sirocco Mining Inc., 100%)	Mine and plant in Aguas Blancas, Antofagasta (Region II)	1,100
Do.	do.	ACF Minera S.A.	Lagunas mine and plant near Iquique, Tarapaca (Region I)	1,400

See footnotes at end of table.

TABLE 2—Continued

CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Iron ore, Fe content		Compañía Minera del Pacífico S.A. (CMP) (CAP S.A., 75%, and MC Inversiones Ltda., 25%)	Cristales and El Algarrobo Mines, El Algarrobito and Huasco concentration plants, Huasco pellets plant, and Los Colorados Mine and concentration plant, Atacama (Region III); El Romeral and El Tofo Mines, and El Romeral concentration and pellet-feed plants, Coquimbo (Region IV); and El Laco concentration plant, Antofagasta (Region II)	9,000
Do.		Minera Hierro Atacama S.A. (Compañía Minera del Pacífico S.A., 100%)	Magnetite plant to process tailings from the Candelaria Mine and other iron-bearing raw materials from third parties, near Copiapo, Atacama (Region III)	2,000
Do.		Minera Santa Fe SCM, 100%	Carmen Mine, near Copiapo, Atacama (Region III)	2,000
Do.		Santa Fe Mining (JSW Steel Ltd., 70%, and Minera Santa Fe SCM, 30%)	Bellavista Mine, near Copiapo, Atacama (Region III)	1,000
Kaolin		Compañía Minera Polpaico Ltda.	El Guindo Mine and a plant in the Santiago Metropolitan Region	NA
Do.		Minera Lealtad Ltda.	Mine and plant at Til Til, Santiago Metropolitan Region	NA
Do.	metric tons	Mario Alberto Pizarro A.S.A.	Plant at Los Vilos, Coquimbo (Region IV)	600
Lapis lazuli	do.	Las Flores de los Andes S.A.	Mine near Ovalle, Coquimbo (Region IV)	400
Lead, mine output	do.	Minera Florida S.A. (Yamana Gold Inc., 100%)	Minera Florida Mine and concentration plant, Santiago Metropolitan Region	NA
Do.	do.	Sociedad Contractual Minera El Toqui Ltda. (Nyrstar NV, 100%)	El Toqui Mine and Doña Rosa concentration plant, Aysen (Region XI), 120 kilometers north of Coyhaique	3,000
Lime, hydraulic		Industria Nacional de Cemento S.A. (INACESA) (Cementos Bío Bío S.A., 100%)	Plants near Antofagasta City, Antofagasta (Region II), and near Copiapo City, Atacama (Region III)	800 [1]
Do.		Soprocal Calerías e Industrias S.A.	Plant at Melipilla, Santiago Metropolitan Region	165
Lithium carbonate	metric tons	Rockwood Lithium Ltda. (Rockwood Holdings Inc., 100%)	Chemetall Foote plant at La Negra, near Antofagasta City, Antofagasta (Region II)	26,000
Do.	do.	SQM Salar S.A. [subsidiary of Sociedad Química y Minera de Chile S.A. (SQM)] (private, 100%)	Plant at Salar del Carmen, near the city of Antofagasta, Antofagasta (Region II)	48,000 [1]
Lithium chloride	do.	do.	do.	NA
Do.	do.	Rockwood Lithium Ltda. (Rockwood Holdings Inc., 100%)	Chemetall Foote plant at La Negra, near Antofagasta City, Antofagasta (Region II)	6,000
Lithium hydroxide	do.	do.	do.	6,000 [1]
Manganese	do.	Manganesos Atacama S.A. (subsidiary of CAP S.A.)	Plant in Coquimbo city and mines in Coquimbo (Region IV)	10,000
Marble, dimension stone	do.	Pier Luigi Indri S.A.	Quarry at Cerrillos, Atacama (Region III)	250
Do.	do.	Compañía Minera Feltre Ltda.	Quarry and plant in Atacama (Region III)	1,400
Methanol		Methanex Chile S.A. (Methanex Corp., 100%)	Two methanol plants at Cabo Negro, near Punta Arenas City, Magallanes y de la Antartica Chilena (Region XII)	3,800 [1]
Molybdenum, mine output	metric tons	Anglo American Sur S.A. (Anglo American plc, 50.1%; Mitsubishi Corp., 20.4%; Corporación Nacional del Cobre, 20%; and Mitsui & Co., Ltd., 9.5%)	Los Bronces Mine and Tortolas molybdenum flotation plant, Santiago Metropolitan Region	3,000
Do.	do.	Corporación Nacional del Cobre (CODELCO) (Government, 100%)	Chuquicamata and Radomiro Tomic Divisions, Antofagasta (Region II)	20,000
Do.	do.	do.	El Teniente Mine and plant, Libertador General Bernardo O'Higgins (Region VI)	6,500
Do.	do.	do.	Andina Division, Atacama (Region III)	5,000
Do.	do.	do.	El Salvador Division, Atacama (Region III)	1,500
Do.	do.	Compañía Minera Los Pelambres S.A., 100%	Los Pelambres Mine and plant, Coquimbo (Region IV)	12,500
Do.	do.	Compañía Minera Doña Inés de Collahuasi SCM, 100%	Collahuasi Mine and molybdenum plant, Tarapaca (Region I)	6,000

See footnotes at end of table.

TABLE 2—Continued
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Molybdenum concentrate, Mo content	metric tons	Minera Valle Central S.A. (Amerigo Resources Ltd., 100%)	Facilities near Rancagua, Libertador General Bernardo O'Higgins (Region VI), to process tailings of the Collahuasi and El Teniente Mines	400
Molybdenum oxide, Mo content	do.	Molibdenos y Metales S.A. (MOLYMET) (private, 100%)	Nos plant, San Bernardo, 30 kilometers south of Santiago, Santiago Metropolitan Region	45,000
Do.	do.	do.	Molynor plant, Mejillones, Antofagasta (Region II)	15,000
Do.	do.	Corporación Nacional del Cobre (CODELCO) (Government, 100%)	Chuquicamata and Radomiro Tomic Divisions, Antofagasta (Region II)	7,500
Natural gas	million cubic meters	Empresa Nacional del Petróleo (ENAP) (Government, 100%)	About 23 oilfields, including Costa Auera, in the Magallanes basin, Magallanes y de la Antartica Chilena (Region XII)	2,200
Do.	do.	GeoPark Chile Ltd. (operator) (GeoPark Holdings Ltd., 100%)	Oil and gas fields and the Kimiri Aike natural gas plant on the Fell block, Magallanes or Austral basin, Magallanes y de la Antartica Chilena (Region XII)	380
Nitrates:				
Primarily potassium nitrate		SQM Nitratos S.A. [subsidiary of Sociedad Química y Minera de Chile S.A. (SQM)] (private, 100%)	El Toco Mine and Maria Elena plant; Pampa Blanca and Pedro de Valdivia Mines and plants; and Coya Sur plant, Antofagasta (Region II)	950 [1]
Primarily sodium nitrate		do.	do.	770 [1]
Nitrates, in fertilizers		Cosayach Nitratos S.A. (Inverraz S.A., 100%)	Mine and plant near Iquique, Tarapaca (Region I)	200
Do.		SQM Industrial S.A.	Mine and plant near Santiago, Antofagasta (Region II)	100
Do.		ACF Minera S.A.	Lagunas Mine and plant near Iquique, Tarapaca (Region I)	NA
Petroleum	thousand 42-gallon barrels	Empresa Nacional del Petróleo (ENAP) (Government, 100%)	About 23 oilfields, including Costa Auera, in the Magallanes basin, Magallanes y de la Antartica Chilena (Region XII)	6,500
Do.	do.	GeoPark Chile Ltd. (operator)	Oil and gas fields in the Fell block, Magallanes or Austral basin, Magallanes y de la Antartica Chilena (Region XII)	800
Petroleum refinery products	do.	Empresa Nacional del Petróleo (ENAP) (Government, 100%)	Aconcagua, Bio Bio, and Gregorio refineries	90,000
Phosphatic materials, natural:				
Guano		Guano Rojo Punta Gruesa Ltda.	Mine and plant near Iquique, Tarapaca (Region I)	3
Phosphate rock, apatite		César B. Formas Ortiz S.A.	Mine near Chanaral, Antofagasta (Region II)	20
Do.		Compañía Minera El Sauce Ltda.	Mine near La Serena, Coquimbo (Region IV)	5
Phosphorite		Compañía Minera de Fosfatos Naturales Ltda. (Bifox Ltda.) (TEHMCORP S.A., 100%)	Mines at and around Bahia Inglesa; Osorno plant near Bahia Inglesa, Atacama (Region III); and Bahia Inglesa plant at Caldera, Coquimbo (Region IV)	45
Do.		Sociedad Contractual Minera Bahía Inglesa	Selaqueos Mine near Bahia Inglesa, Atacama (Region III)	NA
Pig iron		Cía. Siderúrgica Huachipato S.A. (subsidiary of CAP S.A.) (private, 100%)	Plant in Bahia de San Vicente, Biobio (Region VIII), 14 kilometers northeast of Concepcion	1,200
Potash (KCl and K_2SO_4), K_2O content		SQM Salar S.A. [subsidiary of Sociedad Química y Minera de Chile S.A. (SQM)] (private, 100%)	A dual-use plant and three KCl plants at Salar del Carmen, near the city of Antofagasta, Antofagasta (Region II)	1,600
Do.		Rockwood Lithium Ltda. (Rockwood Holdings Inc., 100%)	Chemetall Foote plant at La Negra, Antofagasta (Region II); and Salar de Atacama, Atacama (Region III)	50
Potassium chloride (KCl)		Sociedad Contractual Minera Virginia (Inverraz S.A., 100%)	Mine and plant near Iquique, Tarapaca (Region I)	NA
Do.		ACF Minera S.A.	Lagunas Mine and plant near Iquique, Tarapaca (Region I)	NA
Pumicite, including pozzolan		Empresas El Melón S.A.	Quarry at Rinconada Lo Vial near Maipu, and plant at Santiago, Santiago Metropolitan Region	1,200
Do.		Compañía Minera Polpaico Ltda.	Puzolana Norte Mine, Antofagasta (Region II); and Puzolana Pudahuel Mine and a plant in the Santiago Metropolitan Region	NA
Do.		Minera Río Teno S.A. (Cementos Bío Bío S.A., 100%)	Quarry and plant near Curico, Libertador General Bernardo O'Higgins (Region VI)	200

See footnotes at end of table.

TABLE 2—Continued
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Pumicite, including pozzolan—Continued		Minera El Way S.A. (Cementos Bío Bío S.A., 100%)	Quarries and plant near Antofagasta (Region II)	100
Do.		Harborlite Chile Ltda. (IMERYS S.A., 100%)	Laguna del Maule Mine at Talca, Maule (Region VII), and plant at Santiago, Santiago Metropolitan Region	NA
Pyrophyllite	metric tons	Sociedad Minera Godoy Schwenger y Cía.	Mine and plant near La Calera, Valparaiso (Region V)	1,800
Do.	do.	José Orrego Bugueño S.A.	Mine and plant near Chincolco, Valparaiso (Region V)	1,000
Do.	do.	Mario Alberto Pizarro A. S.A.	Plant at Los Vilos, Coquimbo (Region IV)	1,000
Rhenium, metal	kilograms	Molibdenos y Metales S.A. (MOLYMET) (private, 100%)	Nos plant, San Bernardo, 30 kilometers south of Santiago, Santiago Metropolitan Region	30,000
Salt, NaCl		Sociedad Minera Punta de Lobos S.A. (K+S Aktiengesellschaft, 100%)	Open pit mine in the Salar Grande de Tarapaca, Tarapaca (Region I), and port facilities at Puerto Patillos	8,000[1]
Do.		Benjamín Nuñez Ltda.	Mine near Iquique, Tarapaca (Region I)	NA
Do.		Inversiones Alpina Ltda.	Mine in the Salar Grande Irlanda and plant at Iquique, Tarapaca (Region I)	NA
Do.		Playa Grande Ltda.	Mine in Tarapaca (Region I)	NA
Do.		José Álvarez Jara Ltda.	do.	NA
Do.		Christian Fletcher Ltda.	do.	NA
Do.		Elías Echeverría Ltda.	do.	NA
Do.		Cía. Minera Cordillera Chile S.C.M.	do.	NA
Selenium	metric tons	Corporación Nacional del Cobre (CODELCO) (Government, 100%)	Ventanas smelter and refinery, noble metals plants, Valparaiso (Region V) (byproduct of copper production)	95
Silica, quartz		Cedric Fernández y Compañía Ltda.	Mine and plant near Calama, Antofagasta (Region II)	100
Do.		Antonio Zotti Rosetti y Cía. Sociedad Minera	La Confianza and San Jose Mines near Los Vilos, Coquimbo (Region IV); Margarita and San Nicolas Mines, and a plant near Renca, Santiago Metropolitan Region	20
Do.		Minera Granos Industriales Ltda.	El Turco Mine and Migrin Plant near Cartagena, Valparaiso (Region V)	250
Do.		Productora Cuarzo El Peral Ltda.	El Peral Mine and plant near Cartagena, Valparaiso (Region V)	250
Do.		Minera Alfa Quintay Ltda.	Quarry and plant, Santiago Metropolitan Region	30
Do.		Minera Pacífico Ltda.	do.	NA
Do.		Sociedad Legal Minera Pedro Luís	Mine and plant near Copiapo, Atacama (Region III)	120
Do.		Minera San Pedro Ltda.	Natacha Mine and El Rulo plant at Til-Til, Santiago Metropolitan Region	30
Do.		SLM Santa Dorila de las Arenitas	Mine and plant at Constitucion, Maule (Region VII)	250
Do.		Cristalerías Toro S.A.	Mine at Rancagua, Libertador General Bernardo O'Higgins (Region VI)	120
Do.		Vidrios Lirquén S.A.	Mine and glass plant at Lirquen, Biobio (Region VIII)	80
Do.		Minera Arsil S.A.	Mine and plant at Concepcion, Biobio (Region VIII)	50
Silver:				
Metal grains	kilograms	Corporación Nacional del Cobre (CODELCO) (Government, 100%)	Ventanas refinery, Valparaiso (Region V)	220,000
Mine output	do.	do.	Andina, Chuquicamata, El Teniente, Radomiro Tomic, and Salvador Divisions (byproduct of copper production)	300,000
Do.	do.	Compañía Minera Mantos de Oro (Kinross Gold Corp., 100%)	La Coipa Mine and plant, Atacama (Region III), 140 kilometers north of Copiapo	150,000
Do.	do.	Minera Meridian Ltds. (Yamana Gold Inc., 100%)	El Peñón Mine and concentration plant, Antofagasta (Region II)	300,000
Do.	do.	Minera Florida Ltda. (Yamana Gold Inc., 100%)	Minera Florida Mine and concentration plant, Santiago Metropolitan Region	31000
Do.	do.	Minera Escondida Ltda., 100%	Escondida copper mine and plants, Antofagasta (Region II)	180,000

See footnotes at end of table.

TABLE 2—Continued

CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Silver—Continued:				
Mine output—Continued	kilograms	Empresa Nacional de Minería (ENAMI) (Government, 100%)	Manuel Antonio Matta plant, Paipote; Osvaldo Martínez plant, El Salado; Vallenar plant, Atacama (Region III); and José Antonio Moreno plant, Taltal, Antofagasta (Region II)	6,000
Do.	do.	Compañía Minera Cerro Bayo Ltda. (Mandalay Resources Corp., 100%)	Cerro Bayo Mine and concentration plant, Aysen (Region XI)	110,000
Do.	do.	Compañía Minera Doña Inés de Collahuasi SCM, 100%	Collahuasi Mine and plants, Tarapaca (Region I)	60,000
Do.	do.	Compañía Minera Los Pelambres S.A., 100%	Los Pelambres Mine and plant, Coquimbo (Region IV)	42,000
Do.	do.	Anglo American Sur S.A. (Anglo American plc, 50.1%; Mitsubishi Corp., 20.4%; Corporación Nacional del Cobre, 20%; and Mitsui & Co., Ltd., 9.5%)	Los Bronces Mine and plants, Santiago Metropolitan Region	35,000
Do.	do.	Cía. Contractual Minera Candelaria, 100%	Candelaria Mine and concentration plant, Atacama (Region III)	30,000
Do.	do.	Cía. Contractual Minera Ojos del Salado, 100%	Ojos del Salado copper mine and plant, Atacama (Region III)	4,500
Do.	do.	Sociedad Contractual Minera El Toqui Ltda. (Nyrstar NV, 100%)	El Toqui Mine and Doña Rosa concentration plant, Aysen (Region XI), 120 kilometers north of Coyhaique	11,000
Sodium sulfate	metric tons	SQM Químicos S.A. [Sociedad Química y Minera de Chile S.A. (SQM), 100%]	Nueva Victoria Mine, Tarapaca (Region I), and Maria Elena Mine and Coya Sur plant, Antofagasta (Region II)	80,000
Do.	do.	Sociedad Legal Minera Santa Inés Uno de Antofagasta	Santa Ines Mine near Antofagasta (Region II)	150
Steel, crude		Compañía Siderúrgica Huachipato S.A. (subsidiary of CAP S.A.) (private, 100%)	Primary plant in Talcahuano and plant in Rengo, Biobio (Region VIII)	1,500
Do.		Gerdau AZA S.A.	Steel plants in Renca and Colina, Santiago Metropolitan Region	520
Sulfuric acid		Xstrata Copper Chile S.A. (Glencore Xstrata plc, 100%)	Altonorte smelter, Antofagasta (Region II)	900 [1]
Do.		Anglo American Sur S.A. (Anglo American plc, 50.1%; Mitsubishi Corp., 20.4%; Corporación Nacional del Cobre, 20%; and Mitsui & Co., Ltd., 9.5%)	Chagres smelter, Valparaiso (Region V)	500
Do.		Corporación Nacional del Cobre (CODELCO) (Government, 100%)	Ventanas sulfuric acid plant, Valparaiso (Region V)	380 [1]
Do.		do.	Caletones plant, Libertador General Bernardo O'Higgins (Region VI)	1,000
Do.		do.	Chuquicamata plant, Antofagasta (Region II)	500
Do.		do.	Portrerillos plant, Atacama (Region III)	100
Do.		Empresa Nacional de Minería (ENAMI) (Government, 100%)	Hernán Videla Lira smelter, Paipote, Atacama (Region III)	290
Talc	metric tons	Sociedad Talco Eduardo Martín Abejón Ltda.	Mines near Constitucion, Maule (Region VII), and plant at Santiago, Santiago Metropolitan Region	1,000
Do.	do.	Minera Trucco Ltda.	Mine and plant near Santiago, Santiago Metropolitan Region	NA
Travertine, dimension stone	do.	Mármoles San Marino Chile S.A. (Grupo San Marino S.A., 100%)	Quarry near Calama, Antofagasta (Region II), and plant in Til-Til, Santiago Metropolitan Region	7,000
Do.	do.	Andes Travertine & Stones S.A.	Quarry and plant in Antofagasta (Region II)	NA
Do.	do.	Canteras de Atacama S.A.	Quarry and plant at Calama, Antofagasta (Region II)	6,000
Zeolites	do.	Sociedad Legal Minera Serrín Tercera	Serrin Tercera Mine and Remulcao Plant at Talca, Maule (Region VII)	300
Zinc in concentrate	do.	Sociedad Contractual Minera El Toqui Ltda. (Nyrstar NV, 100%)	El Toqui Mine and Doña Rosa concentration Aysen (Region XI), 120 kilometers north of Coyhaique	35,000
Do.	do.	Minera Florida S.A. (Yamana Gold Inc., 100%)	Minera Florida Mine and concentration plant, Santiago Metropolitan Region	6,500

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[e] Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

[1] Reported figure.

[2] Solvent extraction and electrowinning.

TABLE 3
CHILE: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES[1, 2]

(Thousand metric tons unless otherwise specified)

Commodity		Reserves
Boron materials (B_2O_3 content)		35,000
Coal, all types	million metric tons	171 [3]
Copper, metal content	do.	209 [4]
Gold, metal content	metric tons	2,642 [4]
Iodine		670 [4]
Iron ore, iron content		720,000 [5]
Lithium, metal content		7,500
Molybdenum		1,800 [4]
Natural gas	million cubic meters	98,000 [6]
Nitrates		88,730 [4]
Petroleum	thousand 42-gallon barrels	150,000 [6]
Potash (K_2O equivalent)		150,000
Rhenium	metric tons	1,300
Salt		562 [7]
Selenium	metric tons	25,000
Silver	do.	27,178 [5]
Sulfate (SO_4 content)		42,000

do. Ditto.

[1] Combined proven plus probable reserves estimated from a combination of company, Government, and secondary sources.

[2] Reserves data at the end of 2013 as reported in U.S. Geological Survey Mineral Commodity Summaries 2014, unless otherwise specified.

[3] Proven reserves at yearend 2007 only. Source: U.S. Energy Information Administration, Annual Energy Review 2009, August 19, 2010.

[4] Source: Servicio Nacional de Geología y Minería (SERNAGEOMIN), Anuario de la Minería de Chile 2013.

[5] Includes only the exploitable reserves of Compañia Minera del Pacifico S.A. (CAP S.A.) in Chile. Source: CAP S.A., Memoria Anual, 2012.

[6] Proved reserves only. Source: International Energy Statistics, U.S. Energy Information Administration, May 2013.

[7] Includes only the proven plus probable reserves of Sociedad Minera Punta de Lobos S.A. Source: K+S Aktiengesellschaft, Financial Report, 2012.

The Mineral Industry of Colombia

By Susan Wacaster

The geology of Colombia encompasses five major structural provinces, which are, from east to west, the Amazonian Paleoproterozoic continental lithospheric province, the Mesoproterozoic Grenvillian continental lithospheric province, the Arquia Neoproterozoic oceanic lithospheric province, the western Cretaceous oceanic lithospheric province, and the La Guajira Cretaceous oceanic lithospheric province. Colombia has three well-defined mountain ranges (cordilleras). More than 200 emerald deposits and occurrences have been located in narrow stretches on both sides of the Cordillera Occidental, which is the easternmost of the mountain ranges. Colombia has been a significant gold-producing country; production has come from placer, vein, and lode deposits related to porphyry copper systems. Continental rifting created basins where sediments rich in organic material became the source of the country's petroleum reserves.

Despite well-defined mineral resources in Colombia, development in the mineral industry remained stagnant in 2013. During the year, the Colombian Government defined 40 mining projects to be of national interest, but no new mining project had started up operations since 2010. Of 14,300 mining operations identified in a 2010–11 census, the Government estimated that more than 60% were operating without a mining license. Legislation passed in 2011 requires mineral commodity trading agents and producing mines in Colombia to be registered with the Registry of Mineral Traders (RUCOM) in order to proceed with exports. The Government of Colombia, however, continued to infer mineral production totals from the payment of royalties. The process for exporting mineral commodities requires a certificate showing the payment of royalties, but the origin of the discrete volumes of mineral commodities is often unknown (Bourke, 2013).

In July 2013, artisanal miners (estimated to operate about 9,500 operations) went on a national strike to protest regulations that they believed favor international mining companies. One of the primary demands of the traditional miners to the Government was that their operations be differentiated from those operated by criminal groups that use profits to finance illegal activities (Bourke, 2013).

Minerals in the National Economy

In 2013, Colombia's real gross domestic product (GDP) (using a base year of 2005) increased by 4.7% compared with a 4.0% increase in 2012, making it one of the fastest growing economies in Latin America. In the years 2000 through 2007, the aggregate value contributed to the GDP from the extraction of mineral fuels and the exploitation of mines and quarries fluctuated between $11.1 billion and $12.4 billion. In 2008, that value increased by 10.3% to $13.2 billion; it increased by another 10.5% and 10.7%, respectively, in 2009 and 2010, and by another 14.7% in 2011 to $18.5 billion. By 2012, economic growth in the sector slowed, but the value of mineral fuels extraction and output from mines and quarries nonetheless increased by 5.4% to $19.5 billion.

In 2013, the value contributed to the GDP from the exploitation of mines and quarries was about $20.3 billion, which accounted for 7.7% of the GDP (the same percentage as in 2012). Production of mineral fuels, including crude petroleum, thorium, and uranium, was valued at $14.7 billion compared with $14.1 billion in 2012; production of coal was valued at $3.7 billion compared with $4.0 billion in 2012; production of metallic minerals was valued at $1.2 billion compared with $1.3 billion in 2012; and production of nonmetallic minerals was valued at $863 million compared with $813 million in 2012. The supply of electricity, gas, and water contributed about $939 million to the GDP in 2013 compared with $930 million in 2012 and accounted for 3.6% of Colombia's GDP in both years (Departamento Administrativo Nacional de Estadística, 2014a).

In terms of real GDP, the Colombian economy grew by 6.4% in the first quarter of 2014 compared with the same quarter of 2013. Colombia's economic rate of growth was greater than that of Peru (4.8%), Chile (2.6%), Uruguay (2.4%), Brazil (1.9%), and Mexico (1.8%) for the same time period, and its GDP was expected to be about 4.5% in 2014 and 2015. Colombia's construction sector realized the largest increase (17.2%) in the first quarter of 2014 compared with the first quarter of 2013. The aggregate value of the exploitation of mines and quarries (including fuels) increased by 5.6% in the first quarter of 2014 compared with that of the same period in 2013 owing to a 33% increase in the value of coal production; a 0.5% increase in the aggregate value of production of crude petroleum, natural gas, thorium, and uranium; and a 15% increase in the production value of nonmetallic minerals, which offset an 11.4% decrease in the production of metallic minerals (Departamento Administrativo Nacional de Estadística, 2014d).

Government Policies and Programs

The Ministry of Mines and Energy (MME) of Colombia was created as a result of economic disruptions from World War II, in large part because the European market for Colombia's coffee exports had been cut off. Colombia had been a neutral country in World War II, but the Colombian Government wanted to strengthen its own military and protect the Panama Canal, which it viewed as critical to the development of its economy (Leonard and Bratzel, 2006).

Colombia had been the only source of platinum for the German and Japanese war industries prior to establishing trade with the United States for platinum resources. By 1940, the U.S. Government had begun to acquire Colombia's entire platinum supply and to provide technical assistance for increased production. Platinum was so valuable at the time, however, that Axis countries were willing to pay maximum prices, and, consequently, smuggling became prevalent.

The Colombian Government attempted to control the export of platinum by requiring all producers to sell the metal to the Central Bank, but small producers in remote areas were able to maintain a black market trade of platinum by trafficking the material through Argentina. By 1944, the flow of black-market platinum had been restricted, but by then, its export trade with both the Asian and the European markets had been cut off, leaving the United States as its primary export market. The United States also became Colombia's primary source of imports of many commodities, including graphite, lead, machinery, and steel (Leonard and Bratzel, 2006).

In an effort to advance production from existing industries in Colombia, the Ministry of Mines and Petroleum was created by decree (Decreto 968 of May 18, 1940) to administer the country's mines, petroleum resources, and undiscovered resources, as well as its national laboratory analysis and research—matters that had previously been handled by the Ministry of National Economy. In 1968, the structure of the agency was expanded to cover primary energy resources, including coal, natural gas, petroleum, and radioactive minerals. In 1974, the administrative organization was again revised and through Decree 636 of April 10, 1974, the name was changed to the Ministry of Mines and Energy. By 2001, the MME was composed of special administrative units, including the Unidad de Planeación Minero Energética [Mining and Energy Planning Unit (UPME)] and the Comisión de Regulación de Energía y Gas [Energy and Gas Regulatory Commission (CREG)]. Related public institutions included the Instituto de Investigación e Información Geocientífica, Minero Ambiental y Nuclear (INGEOMINAS); the Instituto de Planificación y Promoción de Soluciones Energéticas (IPSE); and related companies, including Empresa Colombiana de Petróleos (ECOPETROL); Empresa Colombiana de Gas (ECOGAS), and Empresa Nacional Minera Ltda. (MINERCOL), among others. In 2003, the Agencia Nacional de Hidrocarburos [(National Hydrocarbon Agency (ANH)] was created to bring about comprehensive management of hydrocarbon reserves. In 2004, INGEOMINAS (an autonomous entity under the administration of the MME) was restructured and became the Instituto Colombiano de Geología y Minería [Colombian Institute of Geology and Mining], retaining the same acronym for its name. The agency was charged with performing and promoting mineral exploration and managing exploration and exploitation activities in the country. Colombia's most recent Mining Law is law No. 685 of 2001 (Ministerio de Minas y Energía, 2014).

In 2011, the Government released Executive Order 4131 as part of a reorganization of the country's mining and energy sectors. INGEOMINAS' name was changed to the Colombian Geological Survey (CGS). The CGS currently falls under the administration of the MME and is affiliated with the National System of Science, Technology and Innovation, which was created in 2009 by law No. 1286. The Agencia Nacional de Minería (ANM), which is the mining authority in Colombia, was also created as a result of the restructuring in 2011. The primary responsibilities of the ANM include managing Colombia's mineral resources and granting rights for exploration and exploitation; managing contracts and concessions; collecting and overseeing the transfer of royalties; coordinating mine safety; and developing and implementing strategies to promote the exploration for and exploitation of the country's mineral resources (Ministerio de Minas y Energía, 2011; Agencia Nacional de Minería, 2013).

On January 30, 2012, the MME released resolution No. 180102 (the regulatory language for Article 108 of law No. 1450), which defines the strategic minerals of interest to the country and delimits special areas that are open to concession applications and other areas for which no new applications may be submitted. Mineral deposits containing coal (metallurgical and thermal), coltan (niobium and tantalum), copper, gold, iron, magnesium, phosphates, platinum, potassium, and the byproducts, concentrate, and associated minerals thereof, are classified as strategic materials (minerals) based upon the CGS's knowledge of the country's terrain and areas that had been identified as having the greatest potential to host the strategic mineral deposits (Ministerio de Minas y Energía, 2012).

Production

In 2013, copper production decreased by 12.5% to 724 metric tons (t) from a revised 827 t in 2012, all of which came from Atico Mining Corp. of Canada's El Roble Mine. The mine was operating under limited production as exploration and expansion were ongoing. Gold production decreased by 15.8% to 55,745 kilograms (kg) and was carried out by such companies as Gran Colombia Gold Corp. of Canada at its Segovia Operations and Mineros S.A. at its Antioquia Mine and by artisanal miners. Ferronickel production decreased by 5.1%; pig iron production decreased by 12.8%; iron ore and crude steel production decreased by 12.2% and 2.0%, respectively; and silver production decreased by 27.9% (table 1).

Structure of the Mineral Industry

The majority of mines and nonfuel mineral production facilities in the country were controlled or owned by the private sector. Unlicensed gold miners in Colombia were reported by the Government to have accounted for 87% of all gold production in the country as of 2011. Table 2 is a list of Colombia's major mineral facilities (Willis and Smith, 2013).

Mineral Trade

Colombia was a member of the Associación Latinoamericana de Integración [Latin American Integration Association (ALADI)] and the Comunidad Andina [Andean Community (CAN)] and was an associate member country of the Mercado Comun del Súr [Southern Common Market (MERCOSUR)]. Colombia was in the process of establishing a trade accord with the European Union, a free trade agreement with the Republic of Korea, and an economic partnership agreement with Japan. The value of total exports from Colombia in 2013 was $58.4 billion. ALADI, the European Union, CAN, and MERCOSUR, respectively, received 17.3%, 15.8%, 5.8%, and 3.5% of the total value of Colombian exports. With respect to individual countries, the United States received 31% of the total followed by Venezuela (3.8%), Ecuador (3.4%), and Peru (2.2%) (Departamento Administrativo Nacional de Estadística, 2014b, c).

In 2013, exports of combustible (coal, coke, natural gas and related manufactured products, petroleum, and petroleum derivatives) and extractive products were valued at $39.9 billion and accounted for about 67.9% of the value of the country's exported goods [the total of which also included products from the agricultural and manufacturing sectors and other sectors not elsewhere classified in the United Nations Standard International Trade Classification (SITC)] compared with $401 billion and 66.7%, respectively, in 2012. Since the mid-2000s, the value of exports of combustible and extractive industry products as a whole accounted for about 40% of total exports. In 2008, the value of the same category of exports increased by 24.3% compared with that of 2007 in response to the increase in petroleum prices associated with the global economic downturn of 2008–09. In 2013, the value of mineral fuels, lubricants, and related products exports [including classifications of coal (whether or not pulverized, not agglomerated) and briquets (lignite and peat); coke and semicokes; natural and manufactured gas (including liquefied propane and butane; natural gas whether or not liquefied; and petroleum gases); petroleum, petroleum derivatives, and related products; and electrical current] was $39.3 billion compared with $39.5 billion in 2011. The value of metalliferous ore and scrap-metal exports (SITC category 28) was $463 million compared with $479 million in 2012; nonferrous metals exports (SITC category 68), $160.3 million compared with $135.7 million in 2012; and crude fertilizer and unspecified mineral exports [(SITC category 27) (excluding coal, petroleum, and precious gems), $21.2 million compared with $38.7 million in 2012 (Departamento Administrativo Nacional de Estadística, 2014c).

Commodity Review

Metals

Copper.—El Roble copper, gold, and silver underground mine is located in Choco Department. The mine produced ore with an average mill head grade of 2.5% copper and an estimated 2.5 grams per metric ton (g/t) gold. The operation's crusher had a daily throughput capacity of 300 metric tons per day (t/d), and the mill and flotation circuit had a 400-t/d nominal capacity, with copper and gold recovery rates of 90% and 55%, respectively. The concentrate contained 22% copper and 20 g/t gold. In January 2011, Atico Mining Corp. signed an option agreement to acquire a 90% interest in the property and 6,679 surrounding hectares (ha) in Carment de Atrato during a 2-year period. By early 2012, Atico had closed its first initial public offering, and the company conducted exploration drilling in volcanogenic massive sulfide lenses close to the current mine to discover additional ore deposits that would justify an upgrade to the milling facility. Drilling in 2012 and 2013 led to the discovery of high-grade copper and gold mineralization below the working levels that was open at depth and along strike of the mine. The company released a National Instrument 43–101-compliant inferred mineral resource of 1.6 million metric tons (Mt) at grades of 4.5% copper and 3.2 g/t gold using a cutoff grade of 0.7% copper equivalent (Atico Mining Corp., 2012, p. 3; 2013a; 2013b, p. 8–10).

By November 2013, Atico had completed the acquisition of 90% of Minera El Roble S.A. and the surrounding claims and closed an $8 million senior debt financing facility. Atico was the operator of the mine for just 20 days in 2013, but the mill continued to process about 320 t/d on the days of the year that processing took place. The company began constructing an 830-meter-long adit for the recently established mineral resource. Environmental permits for a new tailings dam were received, and completion of the dam was scheduled for some time in 2014. Upgrades to the mill and processing facility to scale up to nominal capacity of 650 t/d were also scheduled (Atico Mining Corp., 2013a).

Gold.—In 2013, Mineros S.A. produced 3,875 kg of gold from its Colombian operations [known as Antioquia Mine and Mina La Ye] compared with about 3,683 kg in 2012; 3,037 kg of the gold was from alluvial resources and the rest was from underground works. Gold production from Gran Colombia of Canada's Segovia Operations (also known by other names, including Carla, Cristales, El Silencio, Frontino, Las Aves, Las Verticales, Maria Dama Mill, Marmajito, Poma Rosa, Providencia, Sandra K, and Pampa Verde) was an estimated 2,800 kg. Gold production from the company's Marmato operation was an estimated 625 kg. Total reported annual gold production from Colombia ranged from about 47,838 kg in 2009 to greater than 66,178 kg in 2012. In 2013, however, reported gold production decreased by 15.8% to 55,745 kg in response to decreased gold prices, which led developed countries, particularly the United States, to liquidate gold-backed securities. Known production from the operations run by Gran Colombia and Mineros, the country's two leading producers, accounted for just 13.1% of the total gold produced in Colombia in 2013, as production from artisanal mining practices continued to be the source of the majority of the gold extracted in Colombia. The Antioquia Department accounted for 48% of the country's total reported production, and the Choco Department accounted for 26.1% (Gran Colombia Gold Corp., 2013; Mineros S.A., 2014, p. 7; Sistema de Información Minero Colombiano, 2014b).

Nickel.—The Cerro Matoso Mine in Montelibano was commissioned in 1980 and commercial production commenced in 1982. The mine had been owned by BHP Billiton Ltd. since 2007. The operation consisted of a beneficiation plant with primary and secondary crushers, a blender and rotary kiln with a nominal capacity of 3 million metric tons per year, and an integrated refinery and smelter. In September 2012, Colombia's state council approved a contract with BHP Billiton that would allow the company to continue operating the Cerro Matoso Mine until 2029. An agreement to extend BHP Billiton's operating contract at Cerro Matoso had been finalized and was pending approval by the President and the ANM. The agreement would extend BHP Billiton's operating contract for another 30 years to 2042. The main point of the agreement was a condition that BHP Billiton maintain or increase production to offset declining ore grades. In July 2013, Colombia's environmental licensing agency rejected a request originally made in 2011 for modification of the license for the Cerro Matoso Mine to allow mining at La Esmeralda deposit adjacent to the existing operation and ruled that BHP Billiton would have to present a new request for an environmental permit for La Esmeralda (BHP Billiton Ltd., 2012, p. 29; Business News Americas, 2013).

Industrial Minerals

Gemstones.—Colombian emerald deposits occur in extensional carbonate-silicate-pyrite veins, pockets, and breccias in an early Cretaceous black shale-limestone succession. The deposits are unusual because there is no evidence for magmatic activity, but the emerald mineralization was found to have formed as a result of hydrothermal growth associated with tectonic activity (Sistema de Información Minero Colombiano, 2014c).

Based on reported data from 2003 through the first 6 months of 2012, total emerald exports exceeded total emerald production by 10%. The export total for that period was 54.7 million carats, whereas production was 49.3 million carats. The difference between the produced and exported amounts in a given year during that period had been between about 5% and 20%. The maximum amount of emerald exported was a revised 9.5 million carats in 2004 and the minimum amount was a revised 997 kg in 2010. Although emerald production had decreased every year since 2004, the amount of emerald exported in 2012 was 7.4 million carats compared with 1.9 million carats in 2011. In 2013 about 45.6 million carats of emerald was exported (45.0 million carats of which was received by the United States) compared with production of just 2.6 million carats (Groat and others, 2008, p. 99–100; Sistema de Información Minero Colombiano, 2014c).

The originator of the large quantity of emerald exported from Colombia was unknown, but the timing of the exports (that is, the months in which the large quantities were exported) suggests a possible connection to the death of the owner of Colombia's most lucrative emerald mines, who had controlled the country's emerald business for decades and reportedly held title to as much as 2 million hectares of land. The power vacuum following his death led to reports of organized crime activity to gain control of the emerald trade. Meanwhile, the Colombian Government was also actively pursuing investors to develop emerald resources as the country's reported production decreased to the current 2.6 million carats from greater than 9 million carats in 2004 (Parkinson, 2013; Fox News Latino, 2014).

Mineral Fuels

Coal.—In 2013, Colombia produced 103.9 Mt of coal, which was about a 17% increase compared with output in 2012. Cesar and La Guajira Departments produced 57.1 Mt and 37.9 Mt, respectively, in 2013, accounting for a combined total of 91% of the coal produced in the country. Subsidiaries of Cerrejon Coal Co., which was a joint venture of Anglo American Plc of the United Kingdom, BHP Billiton, and Xstrata plc of Switzerland, including Carbones Colombianos del Cerrejon, Carbones del Cerrejon, Cerrejon Zona Norte, and Consorcio Cerrejon, produced most if not all of the reported coal from La Guajira Department where the Cerrejon coal mine was in operation. Drummond Ltd. of the United States was the top-ranked coal-producing company in Cesar Department; it produced about 14.5 Mt of coal mostly from La Loma Mine but also from El Descanso Mine (Sistema de Información Minero Colombiano, 2014a).

Drummond was Colombia's second-ranked producer of coal, accounting for almost one-third of the country's production. In January 2014, the Colombian Government required Drummond to halt coal exports owing to pollution caused by loading coal onto ships for export with cranes and barges. The company was in the process of constructing a legally compliant conveyor belt ship-loading system (Murphy, 2014).

Petroleum.—In 2013, production of petroleum in Colombia was about 365.8 million barrels, which was an increase of about 3.2% compared with that of 2012. About 35% of that production came from 116 oilfields that were operated by Ecopetrol S.A. There were 2.4 billion barrels of proven crude petroleum reserves at yearend 2012 (the latest year for which data were available), which was a 5.2% increase compared with reserves in 2011. In 2013, about 100 exploration and production wells were drilled in nine different petroleum basins (Agencia Nacional de Hidrocarburos, 2014).

Outlook

Based on exports of selected nonfuel mineral commodities for the first 6 months of 2014, Colombia's total amount of nonfuel mineral commodity production could increase just slightly in 2014 compared with that of 2013. Copper production is expected to increase as Atico proceeds with expansions at El Roble Mine. Exports of copper from Colombia as of the first 6 months of 2014 had reached 68% of the total exported in 2013. Coal production from Drummond was expected to increase to 26 Mt. Combined with expected production of at least 32 Mt from the Cerrejon Mine, Colombia could have a record year for coal production in 2014.

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TABLE 1
COLOMBIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
METALS						
Copper, mine output, Cu content		1,251	782	889	827 [r]	724
Gold	kilograms	47,838	53,606	55,908	66,178	55,745
Iron and steel:						
Iron ore and concentrate	thousand metric tons	281	77	174	809 [r]	710
Pig iron	do.	342	327	295	345	301
Steel, crude	do.	1,053	1,213	1,290	1,324	1,297
Nickel:						
Mine output, Ni content[e]		72,000	70,200	70,000	70,000	70,000
Ferronickel, Ni content		51,802	49,443	37,817	51,975 [r]	49,319
Platinum	kilograms	929	997	1,231	1,460	1,836
Silver	do.	10,827	15,300	24,045	19,368	13,968
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	9,232	9,488	10,777	10,925	11,252
Gemstones, emerald	thousand carats	2,945	5,230	3,402	3,150 [e]	2,627
Salt:						
Marine		356,797	139,809	151,986	77,841	113,226
Rock		255,332	288,676	305,706	229,344	319,184
Total		612,129	428,485	457,692	307,185	432,410
Stone and sand, limestone for cement		11,449	11,767	13,365	6,697 [r]	4,065
Sulfur; native		54,367	59,556	58,073	63,790	52,470 [3]
MINERAL FUELS AND RELATED MATERIALS						
Coal	thousand metric tons	72,807	74,350	85,803	88,952 [r]	103,885
Gas, natural, gross	million cubic meters	10,400	11,300	11,000 [r]	12,000 [r]	12,600
Petroleum:						
Crude	thousand 42-gallon barrels	244,100	286,800 [r]	334,100 [r]	354,500 [r]	365,800
Refinery products:						
Light distillates:						
Gasoline:						
Motor (extra)	do.	1,200	1,190	1,240	1,230 [r]	1,200 [e]
Motor (regular)	do.	23,330	25,260	25,263	25,438 [r]	25,000 [e]
Medium distillates:						
Diesel fuel	do.	26,632	25,311	34,993	34,730 [r]	35,000 [e]
Jet propellant	do.	8,240	8,430	8,830	8,817 [r]	8,500 [e]
Kerosene	do.	201	264	217	379 [r]	300 [e]
Other:						
Aromatic tar	do.	410	466	446	450 [e]	450 [e]
Asphalt	do.	2,950 [r]	2,417 [r]	2,360 [r]	2,500 [r]	2,500
Avigas	do.	93	93	88	89	88 [e]
Cyclohexane	do.	231	100	153	150 [e]	150 [e]
Fuel oil	do.	23	23	27	26 [r]	25 [e]
Lubricants	do.	575	559	510	550 [e]	550 [e]
Parrafin	do.	275	267	257	250 [e]	250 [e]
Propane	do.	7,353	6,512	6,489	7,000 [r]	7,000 [e]
Solvents	do.	1,225	445	1,261	750 [e]	750 [e]
Total	do.	72,738	71,337	82,134	82,400 [e]	81,800 [e]

[e] Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r] Revised. do. Ditto.

[1] Table includes data available through August 1, 2014.

[2] In addition to the commodities listed, Colombia also produced clays, coke, feldspar, gypsum, magnesite, phosphate rock, sand and gravel, secondary iron, semimanufactures, sulfur (as a byproduct of petroleum processing), thorium, and uranium, but available information is inadequate to make reliable estimates of output.

[3] Production to August 2013.

TABLE 2

COLOMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement		Cía. Colombiana de Clinker S.A. (Cementos Argos Colombia S.A., 100%)	Plant at Cartagena, Bolivar Department	1,250
Do.		Cementos del Caribe S.A. (Cementos Argos Colombia S.A., 74%)	Barranquilla, Atlantico Department	1,500
Do.		Cementos del Valle S.A. (Cementos Argos Colombia S.A., 70%)	Yumbo, Valle del Cauca Department	1,500
Do.		Cales y Cementos de Toluviejo S.A. (Cementos Argos Colombia S.A., 95%)	Toluviejo, Sucre Department	980
Do.		Cementos del Nare S.A. (Cementos Argos Colombia S.A., 100%)	Puerto Nare, Antioquia Department	210
Do.		Cementos El Cairo S.A. (Cementos Argos Colombia S.A., 100%)	Montebello, Antioquia Department	450
Do.		Cementos Paz del Río S.A. (Cementos Argos Colombia S.A., 62%)	Belencito, Boyaca Department	880
Do.		Cementos Ríoclaro S.A. (Cementos Argos Colombia S.A., 99%)	Sonson, Antioquia Department	1,400
Do.		Cementos Boyacá S.A. (Holcim Group, 100%)	Nobsa, Boyaca Department	1,500
Do.		CEMEX Colombia S.A. (CEMEX S.A.B. de C.V., 99.7%)	Bucaramanga, Santander Department; Buenos Aires, Tolima Department; Pamplona, Norte de Santander Department; La Calera, Cundinamarca Department	3,980
Coal		Carbones del Cerrejón LLC (Anglo American plc, 33.3%; BHP Billiton plc, 33.3%; Glencore Xstrata plc, 33.3%)	Cerrejon Centro, Cerrejon Sur, Cerrejon Zona Norte, and Oreganal Mines, La Guajira Department	32,000
Do.		Drummond Ltd. (Drummond Co. Inc., 80%, and Itochu Corp., 20%)	La Loma Mine, Cesar Department	20,000
Do.		do.	El Descanso Mine, Cesar Department	3,000
Do.		C.I. Prodeco S.A. (Glencore Xstrata plc, 100%)	Calenturitas Mine, Cesar Department	16,000
Do.		do.	La Jagua Mine, Cesar Department	7,000
Do.		Pacific Coal Resources Ltd., 100%	La Caypa Mine, La Guajira Department	1,200
Do.		do.	Cerro Largo Mine, Cesar Department	375
Do.		Colombia Energy Resources, 70%	Ruku Mine, Boyaca Department	NA
Do.		Continental Coal Ltd., 50%	Colombia Mine, Guainía Department	NA
Do.		Carbones San Fernando S.A.	San Fernando Mine, Antioquia Department	330
Do.		Mineral & Rocks Corp., 100%	Boyacá Mine, Boyaca Department	47
Do.		Colombian Natural Resources, 100%	El Hatillo Mine, Cesar Department	3,600
Copper		Atico Mining Corp., 90%, and Minera El Roble S.A., 10%	El Roble Mine, El Carmen, Choco Department	3
Gold	kilograms	Gran Colombia Gold Corp. (private, 100%)	Segovia Operations, Antioquia Department, 220 kilometers northeast of Medellin, including El Silencio Mine, Providencia Mine, and Sandra K Mine; Carla Mine, 10 kilometers southeast of Segovia Operations	2,800
Do.	do.	do.	Marmato Mine, Caladas Department, 80 kilometers south of Medellin	1,000
Do.	do.	Mineros S.A., 100%	Antioquia Mine (Mina La Ye), Antioquia Department, 50 kilometers northwest of Medellin	4,000
Do.	do.	Atico Mining Corp., 90%, and Minera El Roble S.A., 10%	El Roble Mine, El Carmen, Choco Department	300
Iron and steel, steel		Diaco S.A. (Gerdau S.A.)	Tuta and Duitama, Boyaca; Cali, Valle del Cauca; Tocancipa, Cundinamarca; Muna, near Bogota	NA
Iron ore		Acerías Paz del Río S.A. (Votorantim Steel, 72.67%)	El Uvo, Pirgua, and Ubalá Mines, Boyaca Department	2,500

See footnotes at end of table.

TABLE 2—Continued
COLOMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Natural gas	million cubic meters	Ecopetrol S.A. (Government, 100%)	North coast, La Guajira Department (national gasfields)	4,500
Nickel		Cerro Matoso S.A. (BHP Billiton Ltd., 99.94%, and mine workers, .06%)	Cerro Matoso Mine and ferronickel plant, Montelibano, Cordoba Department	55
Petroleum	thousand 42-gallon barrels	Ecopetrol S.A. (Government, 100%)	116 fields in various Departments	130,000
Petroleum products	do.	do.	Barrancabermeja refinery, Norte de Santander Department	79,200
Do.	do.	do.	Cartagena refinery, Bolivar Department	28,800

Do., do. Ditto. NA Not available.

THE MINERAL INDUSTRY OF CUBA

By Yadira Soto-Viruet

In 2013, Cuba was estimated to rank 7th among the world's leading producers of cobalt (as a byproduct of nickel processing) and 10th among the world's leading producers of nickel. Other mineral commodities produced in the country included bentonite, cement, crushed stone, feldspar, gypsum, lime, limestone, marble, nitrogen, salt, silica sand, and sulfuric acid. Cuba also produced natural gas, petroleum, and petroleum products. In 2012, the Government created the Ministerio de Energia y Minas (MEM) through passage of law Decree No. 301. The MEM is responsible for establishing Government policy for the energy and mining sectors (Cubaencuentro, 2012; Matos, 2013, p. 2; Kuck, 2014; Shedd, 2014).

Minerals in the National Economy

In 2013, Cuba's real gross domestic product (GDP) increased by 2.7% compared with that of 2012. The industrial manufacturing sector (excluding the sugar industry) made up about 13.2% of the country's GDP; the construction sector, about 6.0%; the sector encompassing electricity, gas, and water, about 1.4%; and the mining and quarrying sector, about 0.6%. In 2013, about 33,000 workers were employed in the mining and quarrying sector, which accounted for about 1% of the workforce in the country compared with 39,000 in 2012. In 2013, about 471 enterprises operated in the industrial manufacturing sector, about 184 enterprises operated in the construction sector, and about 21 enterprises operated in the mining and quarrying sector (Oficina Nacional de Estadística e Información, 2014, p. 128, 137, 144, 168).

Production

In 2013, marble production increased by 23% to 9,600 cubic meters from 7,800 cubic meters in 2012. Bentonite production decreased by 50% to 335 metric tons (t) from 670 t; gypsum, by 34% to 87,000 t from 131,000 t; feldspar, by 16% to 3,200 t from 3,800 t; and estimated cobalt, by 14% to 4,200 t from a revised 4,900 t. Data on mineral production are in table 1.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Mineral Trade

In 2013, the total value of Cuba's exports was about $228 million[1] compared with about $241 million in 2012 (revised). Mining products accounted for about 13.6% (about $31 million) of Cuba's total exports. The country's major export partners were, in order of the percentage of Cuba's total exports they received, Venezuela (43%), Canada and the Netherlands (9% each), China (7%), and Spain (3%). The total value of Cuba's imports was about $635 million in 2013 compared with about $596 million in 2012. Its major import trade partners were, in order of the percentage of Cuba's total imports they supplied, Venezuela (33%), China (10%), and Spain (8%) (Oficina Nacional de Estadística e Información, 2014, p. 184–190).

Commodity Review

Metals

Cobalt and Nickel.—Moa Nickel S.A., which was a joint venture between Sherritt International Corp. of Canada and the Government (50% each), produced a total of 33,542 t of nickel and 3,319 t of cobalt in 2013 compared with 34,263 t of nickel and 3,792 t of cobalt in 2012. Moa Nickel is located in Holguin Province and had an annual capacity of about 37,000 t of mixed sulfides (nickel and cobalt). The joint venture planned to begin the construction of a 2,000-metric-ton-per-day sulfuric acid plant at Moa in the third quarter of 2014 and expected initial production to take place in the fourth quarter of 2015. Sherritt reported that the new plant would provide the necessary sulfuric acid production capacity to eliminate all the company's purchases of sulfuric acid. The new sulfuric acid plant would also support future metals expansion plans, which would include increasing the annual production capacity to 46,000 t of mixed sulfides (Sherritt International Corp., 2013, p. 6; 2014, p. 7–8, 26).

Mineral Fuels

Petroleum.—Sherritt held gross working-interests (ranging from 40% to 100%) in various petroleum production-sharing contracts (PSCs) with Government-owned Unión Cuba-Petróleo. Sherritt operated the Puerto Escondido, the Varadero West, and the Yumuri oilfields located on the northern coast. In 2013, the company employed about 300 workers, of which about 90% were Cuban nationals. The company's share of the oil produced from these three fields combined (based on the percentage of its gross working-interest) was about 20,042 barrels per day (bbl/d) in 2013, all of which the company sold to the Government. Sherritt planned to develop two new wells each at Puerto Escondido and Yumuri and to conduct a well-optimization program at Varadero West in 2014. Sherritt applied for a 10-year extension of its Puerto Escondido and Yumuri PSCs, which would allow for further development drilling. Sherritt was also seeking to come to an agreement with the Government for four new exploration PSCs located on the country's northern coast. Negotiations with the Government were underway, and the company expected the four PSCs to be signed in 2014. Sherritt expected its share of oil production to decrease to 19,000 bbl/d of oil owing to an overall decrease in output as a result of a decrease in reservoir rates (Sherritt International Corp., 2014, p. 13–14, 42).

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[1] Where necessary, values have been converted from Cuban pesos (CUP) to U.S. dollars (US$) at an annual average exchange rate of CUP0.0432=US$1.00 for 2012 and 2013.

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TABLE 1
CUBA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2, 3]		2009	2010	2011	2012	2013
METALS						
Cobalt, mine output, Co content[e]		4,600 [r]	4,800 [r]	5,100 [r]	4,900 [r]	4,200
Nickel, mine output, recoverable laterite (limonitic and serpentinic), Ni content[e]		70,000	69,700	72,500	68,200	66,000
Steel, crude		265,800	277,600	282,100	277,000 [e]	280,000 [e]
INDUSTRIAL MINERALS						
Cement, hydraulic		1,625,700	1,631,400	1,736,300	1,824,800 [r]	1,659,000
Clays:						
Bentonite		670	228	1,244	670	335
Kaolinite[e]		2,000	100 [4]	300	400	400
Feldspar		4,700	2,800	3,100	3,800	3,200
Gypsum	thousand metric tons	78	111	131	131	87
Lime		46,000	49,700	38,000	54,100	52,400
Nitrogen, N content of ammonia		27,200	36,000	45,200	59,200 [r]	63,700
Salt	thousand metric tons	266	272	281	216	222
Sand:						
Calcareous	thousand cubic meters	1,693	1,686	1,785	1,811	1,732
Silica	cubic meters	16,400	11,100	20,400 [r]	24,700	26,100
Stone:						
Limestone	thousand metric tons	2,900	2,600	2,700	2,800	2,800
Marble	cubic meters	5,200	4,300	6,700	7,800	9,600
Stone, crushed	thousand cubic meters	3,416	3,234	3,542	3,943	4,196
Sulfuric acid	thousand metric tons	423	423	417	399 [r]	409
Volcanic ash		62,100	72,300	96,500	256,000	278,900
Zeolites		25,800	30,900	44,600	41,900	43,800
MINERAL FUELS AND RELATED MATERIALS						
Natural gas, marketed	thousand cubic meters	1,155,300	1,072,500	1,019,800	1,034,500	1,066,000
Petroleum:[5]						
Crude	thousand 42-gallon barrels	17,614	19,507	19,422 [r]	19,340 [r]	19,300 [e]
Refinery products:[6]						
Asphalt	metric tons	80,200	86,900	79,600	81,100 [r]	81,000 [e]
Petroleum coke	thousand 42-gallon barrels	18	41	37	6 [r]	10 [e]
Gasoline, motor	do.	4,197	4,844	4,286	3,539 [r]	3,500 [e]
Kerosene	do.	182	2	28	235 [r]	240 [e]
Liquefied petroleum gas	do.	537	691	585	483 [r]	490 [e]
Lubricants	do.	277	342	358	349 [r]	350 [e]
Naphtha	do.	1,376	736	1,341	2,864 [r]	2,900 [e]
Total	do.	86,788	93,555	86,235	88,576 [r]	88,600 [e]

[e] Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r] Revised. do. Ditto.

[1] Table includes data available through January 20, 2015.

[2] In addition to the commodities listed, Cuba also produces crude construction materials, but data on such production are not available, and information is inadequate to make reliable estimates of output.

[3] Source: Oficina Nacional de Estadistica e Información, Anuario Estadistico de Cuba 2013.

[4] Reported figure.

[5] Production has been converted from metric tons to barrels by using the U.S. Energy Information Admininstration factor of 6.449 barrels per metric ton (bbl/t) of crude petroleum.

[6] Production has been converted from metric tons to barrels by using the U.S. Energy Information Administration's factor of 5.51 bbl/t for petroleum coke; 8.53 bbl/t for gasoline; 7.73 bbl/t for kerosene; 11.63 bbl/t for liquefied petroleum gas; 7.00 bbl/t for lubricants; and 8.22 bbl/t for naphtha.

TABLE 2
CUBA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Ammonia		NA	Revolucion de Octubre plant, Nuevitas, Camaguey Province	200
Cement		Cementos Cienfuegos S.A. (Government, 50%, and Holcim Ltd., 50%)	Cienfuegos, Cienfuegos Province	1,500
Do.		Fábrica de Cemento 26 de julio	Nuevitas, Camaguey Province	600
Do.		Fábrica de Cemento Mártires de Artemisa	Artemisa, Artemisa Province	600
Do.		Cementos Curazao N.V.	Barrio Mujica, Mariel, Artemisa Province	1,110
Do.		Fábrica de Cemento Siguaney	Siguaney, Sancti Spiritus Province	300
Cobalt		Moa Nickel S.A. (Government, 50%, and Sherritt International Corp., 50%)	Moa Bay Mine and processing plant, Moa, Holguin Province	4
Nickel		Empresa Niquelífera Ernesto Che Guevara (Government, 100%)	Ernesto Che Guevara Mine and processing plant, Punta Gorda, Holguin Province	34
Do.		Moa Nickel S.A. (Government, 50%, and Sherritt International Corp., 50%)	Moa Bay Mine and processing plant, Moa, Holguin Province	37
Do.		Empresa Niquelífera Comandante René Ramos Latour (Government, 100%)	René Ramos Latour Mine and processing plant, Nicaro, Holguin Province	12 [1]
Petroleum:				
Crude	thousand 42-gallon barrels	Empresa de Perforación y Extracción de Petróleo del Centro	Northern coast between Havana and Cardenas, primarily Mayabeque Province	12
Do.	do.	Sherritt International Corp. (gross working interests of 40% to 100% in various production-sharing contracts with the Government)	Puerto Escondido, Varadero West, and Yumuri	7,000
Refinery products	do.	PDV-Cupet S.A. (Government, 51%, and Petróleos de Venezuela S.A., 49%)	Cienfuegos, Cienfuegos Province	23,700
Do.	do.	Hermanos Díaz refinery (Government, 100%)	Santiago de Cuba, Santiago de Cuba Province	8,000
Do.	do.	Ñico López refinery (Government, 100%)	City of Havana	44,500
Do.	do.	Sergio Soto refinery (Government, 100%)	Cabaiguan, Sancti Spiritus Province	NA
Sand		Algaba quarry	Near Trinidad, Sancti Spiritus Province	50
Do.		Malabe quarry	NA	30
Do.		Cajobabo	Imias, Guantanamo Province	NA
Steel		Grupo Metalúrgico Acinox (Government, 100%), including:	Cotorro, La Havana Province	
		Antillana de Acero		600
Do.		Camagüey	Las Tunas, Las Tunas Province	370
Do.		4 other steel plants	NA	NA
Zeolites		Empresa Geominera Holguin	San Andres plant, Holguin Province	75
Do.		do.	El Chorillo plant, Camaguey Province; Tasajeras plant, Villa Clara Province	NA

Do., do. Ditto. NA Not available.

[1] Operations suspended in March 2012.

THE MINERAL INDUSTRY OF ECUADOR

By Susan Wacaster

In 2013, significant activities in Ecuador's mineral sector included amendments to the Mining Law (Ley de Minería) of 2009 and the announcement by Kinross Gold Corp. of Canada that it was pulling out of its Fruta del Norte (FDN) project. At yearend 2012, FDN was estimated to contain more than 200,000 kilograms (kg) of gold and 280,000 kg of silver in proven and probable reserves.

Minerals in the National Economy

Provisional data from the Central Bank of Ecuador indicated that the portion of the real gross domestic product (GDP) (using 2007 as the base year) contributed by the production of natural gas, petroleum, and related services in 2013 increased to $6.5 billion, or by 7.5% compared with that of 2012, and accounted for about 9.7% of the GDP compared with 9.9% in 2012. The portion contributed by the production of petroleum refinery products decreased to $661 million in 2013, or by 26% compared with that of 2012. The value of production from mines and quarries, the fabrication of unspecified nonmetallic mineral products, and the fabrication of base-metal products and products derived from metal increased by 11.8% compared with that of 2012 to $1.5 billion and accounted for 2.2% of the GDP compared with a revised 2.1% in 2012. In nominal terms, the value of the production of natural gas, petroleum, and related services in 2013 was $11.9 billion; that of production from mines and quarries, the fabrication of unspecified nonmetallic mineral products, and the fabrication of base-metal products and products derived from metal was $1.8 billion; and that of the output of petroleum refinery products was $281 million (Banco Central del Ecuador, 2014a).

The value of mineral exports in 2013 (including the value of exports of copper, gold, lead, and silver concentrates; crude petroleum; and other unspecified minerals) was $19.8 billion, which accounted for 67.1% of total exports (66.6% of which was accounted for by crude petroleum) compared with $18.2 billion in 2012. Imports of unspecified mineral products accounted for 24% of total imports, or $6.4 billion compared with a revised $5.7 billion in 2012. The value of imported base metals and articles thereof increased by 10.6% to $2.2 billion. The value of imported articles of asbestos, cement, ceramic products, glass and glassware, mica or similar materials, stone, and plaster increased by 2.1% to $313 million (Banco Central del Ecuador, 2014a).

Ecuador received less foreign direct investment (FDI) per capita in 2013 than any other country in Latin America. FDI directed towards mines and quarries in Ecuador has fluctuated greatly since the early 2000s, owing primarily to legislative, political, and regulatory actions by the Ecuadorian Government. Between 2004 and 2011, the sector encountered annual disinvestment of as great as $116.6 million (in 2006) and annual investment of as low as $5.8 million (in 2009). In 2011, FDI inflows to the mining and quarrying sector reached $379.2 million, which hadn't been achieved since 2004. In 2013, the total amount of FDI directed towards mines and quarries was $252.9 million compared with $224.9 million in 2012, which was an increase of 12.4% (Economist, The, 2013; Banco Central del Ecuador, 2014a).

Government Policies and Programs

The mining law that went into effect in 1991 (Law 126) originally incorporated the concepts of state ownership of mineral deposits and mines as well as Government regulation of mining activities. Those policies and subsequent reforms continued to be developed into the 2000s. By 2008, the administration had put in place a moratorium on metal mining, revoked thousands of concessions, rewrote the country's Constitution and Mining Law, and reorganized the administrative agencies of the mineral sector. Those major changes had the effect of decreasing FDI in the mineral sector, as the reforms included large windfall profit taxes and no ceiling on mining royalties. Ecuador's current mining law, the Mining Law, was issued in 2009 and amended in 2013. The new Mining Law places no limits on the number of mining concessions that an entity can hold, grants renewable 25-year term limits on concessions, and requires concise timelines for project exploration and development (because many of the former mining concessions had been held speculatively for years without any development work being completed).

Prior to 2013, the Mining Law had classified mining operations as either small scale or large scale. Those operations that produced less than 300 metric tons per day (t/d) of mined material on an individual concession were categorized as small scale and were required to pay a fixed royalty of 3%. Operations that produced more than 300 t/d were classified as being large scale and were required to enter into an exploitation contract with the Government that set out specific terms and conditions of the particular operation, including the royalty (of not less than 5%) and the application of a windfall tax. Amendments to the Mining Law in 2013 included a classification for medium-scale mining operations. The medium-scale operations are underground operations that produce less than 1,000 t/d, open pit operations that produce less than 2,000 t/d, and alluvial operations that produce less than 3,000 t/d (Dynasty Metals & Mining Inc., 2011, p. 1–2; 2012; Bourke, 2014).

Production

Gold production was estimated to have decreased by about 18% in 2013 to 2,800 kg. The continued decrease in gold production reflects the overall decrease in the country's mining activities owing to changes in mining legislation. Data on mineral production are in table 1.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Mineral Trade

Ecuador was a member of the World Trade Organization; a partner in the Comunidad Andina (Andean Community, also known as CAN), which is a customs union composed of member countries Bolivia, Colombia, Ecuador, and Peru (and associate countries Argentina, Brazil, Chile, Paraguay, and Uruguay); and an associate member of the Mercado Común del Sur (Southern Common Market, also known as MERCOSUR), which is a trade block composed of Argentina, Bolivia, Brazil, Paraguay, Uruguay, and Venezuela. In 2013, Ecuador exported about 140 million barrels (Mbbl) of crude petroleum valued at $13.4 billion compared with 130 Mbbl valued at $12.7 billion in 2012, which indicated a 2% decrease in the price per barrel received in 2013. The United States was the leading recipient of petroleum from Ecuador, having imported 88.1 Mbbl valued at $8.4 billion. Chile and Peru were the second- and third-ranked importers of Ecuadorian petroleum, having received 21.8 Mbbl valued at $2.1 billion and 15.2 Mbbl valued at $1.5 billion, respectively. In terms of value, the United States, Chile, and Peru accounted for 89.6% of Ecuador's crude oil exports. Based on the reported totals for volume and value of exports, it appeared that Chile and Peru paid 3.5% more per barrel of Ecuadorian petroleum than did the United States (Banco Central del Ecuador, 2014b).

The total amount of petroleum products that were exported was about 69.7 Mbbl compared with 71.6 Mbbl in 2012. In 2013, 19,505 metric tons (t) of gold and silver concentrate, 10,376 t of lead and copper concentrate, and 110,384 t of other unspecified minerals were exported compared with 14,601 t of gold and silver concentrate, 7,163 t of copper and lead concentrate, and 35,460 t of other unspecified minerals in 2012. The country imported about 6.7 million metric tons (Mt) of unspecified mineral products; 1.3 Mt of unspecified base-metals and manufactured base-metal products; 461,600 t of asbestos, cement, ceramic products, glass and glass products, mica, and stone products; and about 1,600 t of natural and (or) cultivated pearls, precious and semiprecious gemstones, precious metals, and precious-metal products. In terms of the value of all exports from Ecuador, the United States was Ecuador's leading trade partner followed by Peru and Chile (Banco Central del Ecuador, 2014a, b).

Commodity Review

Metals

Gold.—In June 2013, Kinross Gold Corp. of Canada reported that it would not continue to negotiate agreements with the Ecuadorian Government for the FDN gold and silver project. When the most recent economic evaluation phase of the project expired on August 1, ownership of La Zarza concession, which contains the entire FDN mineral resource, reverted back to the Government. Kinross reported that it was unable to renegotiate the 70% windfall profits tax or extend the company's current licenses beyond August 1. Chile's Corporación Nacional del Cobre (CODELCO) was considered a likely partner for the Government to proceed with construction of the project (Jamasmie, 2014).

Mineral Fuels and Related Materials

Natural Gas.—In 2013, Ecuador's natural gas reserve estimate was 6 billion cubic meters, which was the same as in 2012. Natural gas reserve estimates had decreased steadily from 1990 to 1999, when reserves were estimated to be 111 billion cubic meters, and then decreased significantly in 1999 to 29 billion cubic meters. By 2007, the estimate had decreased to 8 billion cubic meters. Marketed production of natural gas, which includes gross withdrawals from reservoirs less the quantities used for reservoir repressuring and the quantities vented or flared (Ecuador flared about one-half of the gross total volume of natural gas extracted) was 515 million cubic meters in 2013 compared with 517 million cubic meters in 2012. The country reported zero natural gas exports in 2013 (Organization of the Petroleum Exporting Countries, 2013, p. 11, 33; 2014, p. 8, 32).

Petroleum.—In 2013, Ecuador produced about 192 Mbbl of petroleum, which accounted for just 0.7% of the world's total production for the year but was a 4.2% increase compared with the country's production in 2012. In 2013, petroleum output from public companies, which had increased every year since 2005, reached 145 Mbbl compared with 134 Mbbl in 2012. Alternatively, production from private companies had decreased every year since 2005 and totaled 47 Mbbl in 2013 compared with 51 Mbbl in 2012. Ecuador's crude oil reserve was 8.8 billion barrels (Gbbl) in 2013 compared with 8.2 Gbbl in 2012. Petroleum reserve estimates had been steadily increasing since 1990 when the reserve was estimated to be 1.4 Gbbl, followed by a significant increase in 1992 to 3.2 Gbbl. The country's cumulative petroleum production since 1960 up to and including 2013 was 5.2 Gbbl (Banco Central del Ecuador, 2014a, b; Organization of the Petroleum Exporting Countries, 2014, p. 8).

Refinery Products.—Ecuador's production of refinery products in 2013 decreased by 2.5% to 69.7 Mbbl compared with that of 2012. The decrease in production was despite a reported increase of 1.3% in refinery capacity to 190,800 barrels per day (Banco Central del Ecuador, 2014a; Organization of the Petroleum Exporting Countries, 2014, p. 36).

Outlook

The value derived from the mineral industry of Ecuador is expected to remain about the same in 2014 as in 2013, but inward FDI to the mineral sector is expected to increase in the next 4 years owing to the recent amendments to the mining code. At the beginning of 2014, the amount of royalties and taxes that would be applied to the medium-scale miners had not been finalized, but there were reports that new regulations might include a 4% royalty on gold and gold byproducts, unspecified value-added taxes, and between 5% and 10% profit-sharing taxes (Bourke, 2014).

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TABLE 1
ECUADOR: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013[e]
METALS						
Gold, mine output, Au content	kilograms	5,392	4,593	4,149	3,413 [r]	2,800
Silver, mine output, Ag content	do.	116	1,169	1,398	1,100	500
Steel, crude		259,000	372,000	525,000	536,000	562,000
INDUSTRIAL MINERALS						
Carbon dioxide (CO_2)	kilograms	183	126	512	500	500
Cement, hydraulic	thousand metric tons	5,310	5,280	5,700	6,025	6,600
Clays, unspecified		1,306	1,456	1,511	1,500	1,500
Feldspar		111,985	156,888	83,481	85,000	90,000
Limestone	thousand metric tons	4,957	3,862	4,638	4,500	4,700
Sand		6,190	5,568	27,061	30,000	32,000
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural, marketed	million cubic meters	300 [r]	330 [r]	240 [r]	517 [r]	515
Liquefied natural gas[e]	thousand 42-gallon barrels	300	300	300	267 [3]	300
Petroleum:[3]						
Crude	do.	177,620	177,374	185,800	184,315	192,000
Refinery products:						
Diesel fuel	do.	13,185	11,064	15,630	12,215	10,897 [3]
Distillate fuel oil[4]	do.	8,595	8,472	9,918	9,048	8,718 [3]
Residual fuel oil[5]	do.	10,159	9,447	10,754	8,238	6,784 [3]
Gasoline[6]	do.	14,190	12,486	15,416	17,133	18,619 [3]
Gasoline[7]	do.	4,396	4,704	4,875	5,638	5,213 [3]
Liquefied petroleum gas	do.	3,036	2,004	3,046	2,674	2,604 [3]
Other	do.	26,425	12,954	13,002	16,704	16,843 [3]
Total	do.	79,985	61,132	72,639	71,469	69,678 [3]

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto.

[1] Table includes data available through October 10, 2014.

[2] In addition to the commodities listed, some additional construction materials are produced, including copper, gravel, kaolin, lead, marble, pumice, pozzolan, and sulfur, but available information is inadequate to make reliable estimates of output.

[3] Reported figure.

[4] Reported as Fuel Oil #4.

[5] Reported as Fuel Oil #6.

[6] Octane rating 87.

[7] Octane rating 92.

TABLE 2

ECUADOR: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Cement		Holcim Ecuador S.A. (Holcim Ltd., 92.1%, and other private, 7.9%)	Cerro Blanco plant, Guayaquil, Guayas Province, and San Rafael grinding plant, Latacunga, Cotopaxi Province	5,500
Do.		Lafarge Cementos S.A.	Cement plant near capital city of Quito, Pichincha Province	1,600
Do.		Unión Cementera Nacional UCEM C.E.M.	Kriobamba, Chimborazo Province	1,000
Do.		Industrial Guapan S.A.	Agozes, Canar Province	600
Gold	kilograms	Dynasty Metals and Mining Inc., 100%	Zaruma gold mine in El Oro Province	2,200
Natural gas	million cubic meters	Petroamazonas EP	Amistad field, Gulf of Guayaquil	500
Petroleum:				
Crude	thousand 42-gallon barrels	Empresa Publica de Hidrocarburos del Ecuador (EP Petroecuador) (Government, 100%)	About 26 active fields, led by Sacha, Sucumbios Province, and Shushufindi, Napo Province	200
Do.	do.	Petroamazonas EP (Government, 100%)	About 85 active fields led by fields in the Amazon basin with operations in Orellana, Sucumbios, Napo, and Guayas Provinces	105
Do.	do.	Operaciones Rio Napo (EP Petroecuador and Petroleos de Venezuela S.A.)	Sacha oilfield	21
Refinery products	thousand 42-gallon barrels per day	Empresa Publica de Hidrocarburos del Ecuador (EP Petroecuador) (Government, 100%)	Esmeraldas refinery, Esmeraldas Province	110
Do.	do.	do.	La Libertad refinery, Santa Elena Province	45
Do.	do.	do.	Shushufindi Industrial Complex	20
Do.	do.	do.	Sucumbios refinery	2
Do.	do.	Andes Petroleum Ecuador Ltd.	do.	4

[e] Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto.

THE MINERAL INDUSTRY OF FRENCH GUIANA

By Philip M. Mobbs[1]

French Guiana is an overseas Department of France. The mineral sector is administered through the Prefect of the French Guiana region by the Direction de l'Environnement, de l'Aménagement et du Logement de Guyane [Branch of Environment, Planning, and Housing of French Guiana] and by the Ministère de l'Ecologie, du Développement Durable et de l'Energie [Ministry of Ecology, Sustainable Development, and Energy]. French Guiana's mineral resources included clays, gold, niobium, petroleum, sand, stone, and tantalum. Laws that regulate mining activity include the French Code Minier; Decree No. 2001–204, which authorizes the exploitation of mines in the overseas Departments; Decree No. 2011–2105, which provides for the exploration for and exploitation of minerals; and Decree No. 2011–2106, which provides implementation guidelines for Decree No. 2011–2105 (table 1; Gismatullin, 2013).

Commodity Review

Metals

Gold.—Local subsidiaries and contractors of Auplata S.A. of France produced about 652 kilograms (kg) of gold (reported as 20,953 troy ounces) in 2013 compared with about 573 kg (reported as 18,413 troy ounces) in 2012 and about 414 kg (reported as 13,298 troy ounces) in 2011. Operations at the Yaou Mine were suspended in late 2013. Much of French Guiana's gold output was produced by small artisanal operations (Marot, 2013; Auplata S.A., 2014; Scope Ratings GmbH, 2014).

The average international price of gold was about $1,531 per troy ounce in 2013 compared with $1,669 per troy ounce in 2012, $1,568 per troy ounce in 2011, $972 per troy ounce in 2009, and $410 per troy ounce in 2004. The increase in the international price of gold in recent years appears to have resulted in a renewed interest in artisanal gold production in French Guiana despite the Government's strong efforts to control illegal activity (GoldPrices.com, 2014; Préfecture Guyane, 2014).

In 2008, the Government began Operation Harpie, in which local police, national gendarmerie, and the French Foreign Legion coordinated operations in the region's interior that were focused on the reduction of illegal gold-mining activity, especially that which resulted in significant environmental damage. Much of the illegally produced gold was recovered by amalgamation with mercury, the use of which had been banned in French Guiana since 2006. Use of mercury often resulted in contamination of forests, riparian areas, soils, and streams associated with artisanal placer mining. Illegally produced gold also was smuggled out of the Department, which resulted in a significant loss of potential Government revenue. According to the Government's Office National de Forêts [National Office of Forests], the number of illegal gold mining sites in French Guiana increased to 774 in 2013 from 726 in 2012, 392 in 2011, 497 in 2010, 612 in 2009, 298 in 2007, and 173 in 2004. The 19% decrease in illegal sites between 2009 and 2010 could be attributed to the effectiveness of Operation Harpie (Ministère de la Défense, 2008; Stabroeknews.com, 2008; Préfecture Guyane, 2014).

Mineral Fuels

Petroleum.—Royal Dutch Shell plc of the Netherlands (45% equity interest) drilled three exploration wells on the offshore Guyane Maritime permit in 2013 for its joint-venture partners Hardman Petroleum France SAS (27.5% interest), which was a subsidiary of Tullow Oil plc of the United Kingdom; Total S.A. of France (25% interest); and Northpet Investments Ltd. (2.5% interest), which was a joint venture of Northern Petroleum Plc of the United Kingdom and Wessex Exploration PLC of the United Kingdom. The Shell joint venture expected to continue to evaluate the well data in 2014 (Gismatullin, 2013).

Outlook

Gold exploration and production activities in French Guiana are expected to continue. French Guiana has a number of identified but not commercially developed gold deposits. Auplata is expected to begin a pilot-plant testing of a recovery process that could replace the current gravity-based methods of processing gold. Chemical processing is expected to result in a greater gold-recovery rate and to allow gold-bearing material in tailings dumps to be reprocessed (Théveniant and others, 2011, p. 67; Auplata S.A., 2014).

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TABLE 1
FRENCH GUIANA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Thousand metric tons unless otherwise specified)

Commodity[3]		2009	2010	2011	2012	2013
Cement, hydraulic	metric tons	62,000	89,064 [4]	90,000 [r]	100,000 [r]	92,000
Columbite and tantalite	kilograms	1,500	1,500	1,500	1,500	1,500
Gold, mine output, Au content	do.	2,000	1,140 [4]	1,130 [r, 4]	1,460 [r, 4]	1,600
Laterite		650	680 [4]	700	700	700
Sand, common		1,500	437 [4]	500	600 [r]	500
Stone, crushed		1,500	1,200 [4]	1,200	1,300 [r]	1,200

[r] Revised. do. Ditto.

[1] Estimated data are rounded to no more than three significant digits.

[2] Table includes data available through December 8, 2014.

[3] In addition to the commodities listed, French Guiana also produced clays, but available information is inadequate to make reliable estimates of output.

[4] Reported figure.

TABLE 2
FRENCH GUIANA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Country		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement		Ciments Guyanais S.A. (Holcim Ltd., 50%, and Lafarge S.A., 50%)	Clinker-grinding plant at Degrad des Cannes, about 10 kilometers southeast of Cayenne	180
Columbite and tantalite	kilograms	Numerous legal and illegal placer mines	Various locations in northwestern French Guiana	1,500
Gold	do.	Auplata S.A., 100%	Dieu Merci Mine, near Saint-Elie, about 120 kilometers west of Cayenne	600
Do.	do.	Société Minière Yaou Dorlin S.A.S. (Auplata S.A., 100%)	Yaou underground mine,[1] about 225 kilometers southwest of Cayenne	NA
Do.	do.	Compagnie Minière Dorlin S.A.S. (Auplata S.A., 100%)	Dorlin placer mine, about 190 kilometers southwest of Cayenne	100
Do.	do.	Numerous legal and illegal placer mines	Various locations	1,000
Sand		About 10 sand pits	do.	NA
Stone, crushed		About nine rock quarries	do.	NA

Do., do. Ditto. NA Not available.

[1] Operations were suspended in 2013.

THE MINERAL INDUSTRY OF GUYANA

By Philip M. Mobbs[1]

Guyana's economy improved in 2013; real gross domestic product (GDP) increased by 5.2% compared with that of 2012. This increase was attributed to positive economic performances in the services sector (which accounted for 65.2% of the GDP), the agricultural sector (22.1% of the GDP), and the mining sector (12.1% of the GDP). In 2013, the mining sector's contribution to the GDP increased slightly from 11.8% in 2012 (Bank of Guyana, 2014, p. 7, 10).

The value of Guyana's exports was estimated to be about $1.376 billion in 2013 compared with $1.416 billion in 2012. The leading mineral commodity exports in 2013 were, in order of value, gold ($648.5 million compared with $716.9 million in 2012), bauxite ($134.6 million compared with $150.8 million in 2012), and diamond ($12.2 million compared with $8.2 million in 2012). The decrease in the value of gold exports was attributed to the drop in world gold prices. The decrease in the value of bauxite shipments was attributed to an 18.5% decrease in the volume of metal-grade bauxite exports (Bank of Guyana, 2014, p. 16–18; Kitco Metals Inc., 2014).

Imports were valued at $1.847 billion in 2013 compared with $1.997 billion in 2012, and included such products as, in order of value, petroleum products (about $575 million compared with a revised $638 million in 2012) and mining equipment (about $22.6 million in 2013 compared with $38.1 million in 2012) (Bank of Guyana, 2014, p. 18).

Production

Bauxite, diamond, and gold output was exported and loam, sand, and stone were produced for domestic use. According to the Guyana Geology and Mines Commission (GGMC), Guyana's production of sand increased by about 58% in 2013 compared with that of 2012; diamond, by 37%; and stone, by 35%. Bauxite production decreased by 25% (table 1).

Structure of the Mineral Industry

In Guyana, all mineral rights are vested in the state. The Mines Division and the Petroleum Division of the GGMC regulate mineral exploration and mineral resource development activities in accordance with national legislation, which includes the Mining Act (Chapter 65:01) of 1989, the Minerals Act (Chapter 65:07) of 1971, and the Petroleum (Exploration and Production) Act (Chapter 65:10) of 1986. The Guyana Gold Board purchased all gold produced in Guyana (Guyana Geology and Mines Commission, 2014). Table 2 is a list of the major mineral industry facilities in Guyana.

Commodity Review

Metals

Bauxite and Alumina.—United Company RUSAL Plc of Jersey [United Kingdom] reported that its subsidiary Bauxite Company of Guyana, Inc. (BCGI) operated at an 80% capacity utilization rate in 2013. A technological change introduced in 2012 at the Nikolaev alumina refinery (NGZ) in Ukraine resulted in reduced demand by the NGZ plant for bauxite from Guyana, Jamaica, and Sierra Leone, which cost more than bauxite imported from Kindia in Guinea (United Company RUSAL Plc, 2014, p. 15, 21).

In 2013, BCGI continued work on the development of the Kurubuka-22 bauxite deposit, which is located in Aroaima. The new Kurubuka Mine was expected to open in 2014. The Bosai Minerals Group Guyana Inc., which was a subsidiary of Bosai Minerals Group Company. Ltd. of China, continued exploration and development work on its Block 37 project. Guyana Industrial Minerals Inc., which was a subsidiary of First Bauxite Corp. of Canada, held the Bonasika mining license and the Tarakulli prospecting license. In 2013, First Bauxite initiated a preliminary economic assessment of the use of Bonasika bauxite to manufacture ceramic proppants for use by the oil and gas industry in the process of the hydraulic fracturing of petroleum reservoirs (First Bauxite Corp., 2014, p. 3–6; United Company RUSAL Plc, 2014, p. 15).

Gold.—In 2013, according to the GGMC, production of gold increased to 14,694 kilograms (kg) (reported as 481,103 troy ounces) from 13,643 kg (438,645 troy ounces) in 2012. In Guyana, gold was mined by hundreds of small-scale artisanal mining operations that collectively held thousands of gold mining permits. The decrease in international gold prices during 2013, however, adversely affected the exploration activities of some of the international gold companies that were operating in Guyana (table1; Chapwanya, 2013a; Kitco Metals Inc., 2014).

In January, Guyana Goldfields Inc. (GGI) of Canada filed an updated feasibility study of the Aurora gold project. In December, GGI entered into an engineering, procurement, and construction contract to build a 5,000-metric-ton-per-day-capacity processing facility at Aurora; commercial gold production was expected to begin in mid-2015. GGI also continued preliminary exploration at the Aranka prospect and other gold projects. Work consisted primarily of soil and stream-sediment sampling and analysis (Guyana Goldfields Inc., 2014, p. 4–5, 10).

In 2011, Hunter Bay Minerals plc of the United Kingdom had acquired operating rights for 14 alluvial permits in the Mazaruni and the Puruni areas. The company discontinued operations in Guyana in late 2012 owing to metallurgical issues discovered during trial mining of the deposits (Hunter Bay Minerals plc, 2014, p. 5).

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[1] Deceased.

Exploration activity by local subsidiaries of Mahdia Gold Corp. of Canada reportedly were constrained by the parent company's financial difficulties; however, in June, Mahdia and Roraima Investment and Consulting Services Inc. of Guyana agreed to begin to process an alluvial gold deposit on the formerly producing Omai property. Production was expected to begin in early 2014. Mahdia's Tiger River and the White Creek properties were on care-and-maintenance status. Mahdia indicated that it hoped to restrict ongoing unauthorized gold mining operations on the Tiger River property (Chapwanya, 2013a, b; Mahdia Gold Corp., 2014, p. 1–6).

In 2012, Mulgravian Ventures (Guyana) Inc. (51% equity interest), which was a subsidiary of Mulgravian Ventures Corp. of Canada, completed a diamond-drilling program on the Five Star gold property for its joint venture with Romanex (Guyana) Exploration Ltd. (49% interest), which was a subsidiary of Guyana Frontier Mining Corp. of Canada. Romanex continued its exploration of the Marudi Mountain (100% interest) and the Paint Mountain (100% interest) gold projects. In July, Romanex signed an agreement that authorized Mulgravian Ventures to manage the infrastructure, logistics, mining of surficial material (including the alluvial, colluvial, and eluvial deposits), and security operations at Marudi Mountain. Guyana Frontier planned to continue its evaluation of developing the hard-rock resources at Marudi Mountain. In 2013, Guyana Frontier surrendered the Otomung property to Guyana Shield Resources Inc. (Guyana Frontier Mining Corp., 2013).

Sacre-Coeur Minerals, Ltd. of Canada (SCM) continued exploration activity on gold prospects in the Lower Puruni regional area. In late 2013, a 22-week trial mining of alluvial deposits in the Lower Puruni region produced about 13.5 kg of gold (reported as 432.78 troy ounces), and the results of six diamond-drill holes in Zone 1 of the region were evaluated. Exploration on SCM's Northwest project was deferred in 2013 (Sacre-Coeur Minerals, Ltd., 2014, p. 4–6).

In 2013, Sandspring Resources Ltd. of Canada filed a National Instrument 43–101-compliant prefeasibility study of the Toroparu gold project. ETK, Inc. of Guyana, which was a wholly owned subsidiary of Sandspring Resources, was exploring the Toroparu project, which was located in the Upper Puruni River area.

Mineral Fuels and Related Materials

Petroleum and Natural Gas.—Several domestic and international oil company joint ventures held petroleum exploration rights to coastal and offshore blocks. Although Guyana settled its maritime border disagreement with Suriname in 2007, the maritime border between Guyana and Venezuela remained in dispute. In 2013, the Venezuelan Navy intercepted a seismic vessel at sea that was contracted to survey the seafloor for Anadarko Guyana Co., which was a subsidiary of Anadarko Petroleum Corp. of the United States. The ship subsequently was released, but Anadarko's offshore exploration activity on the area was suspended pending a resolution of the longstanding border dispute (Guyana Times, 2013).

Offshore, the joint venture of Esso Exploration and Production Guyana Ltd. (75% equity interest), which was a subsidiary of Exxon Mobil Corp. of the United States, and Shell Exploration and Production Guyana Ltd. (25% interest), which was a subsidiary of Shell International B.V. of the Netherlands, continued to evaluate its deepwater Stabroek petroleum prospecting license. Tullow Guyane B.V., which was a subsidiary of Tullow Oil plc of the United Kingdom, acquired 30% interest in the Kanuku Block from Repsol Exploracion S.A. of Spain.

Onshore, the joint venture of Canacol Energy Inc. of Guyana (90% working interest), which was a subsidiary of Canacol Energy Ltd. of Canada, and Takutu Oil and Gas Inc. of Guyana (10% working interest), which was a subsidiary of Groundstar Resources Inc. of Canada, were evaluating the Rewa Block on the Takutu Basin petroleum prospecting lease. CGX Energy Inc. of Canada was evaluating the Demerara Block. Nabi Oil and Gas Inc. of Guyana initiated preliminary exploration of the Mahaica/Mahaicony prospecting permit, and ON Energy Inc. of Guyana, in which CGX Energy held 62% equity interest, was evaluating the Berbice petroleum prospecting license.

Uranium.—In 2012, U3O8 Corp. of Canada completed a resource estimate on the Kurupung project. Work on the prospect was suspended in 2013 pending improvements in the availability of funding from the international equity markets and a recovery of demand for ore by the uranium market (U3O8 Corp., 2014, p. 3, 7, 9).

Outlook

Bauxite, diamond, gold, sand, and stone are likely to continue to be the dominant mineral commodities produced by Guyana's mineral industry. Offshore and onshore hydrocarbon exploration activity in Guyana may change, depending on how the exploration budgets of exploration companies respond to the volatility of the international price of crude oil.

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TABLE 1
GUYANA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
Bauxite, dry equivalent, gross weight	thousand metric tons	1,485	1,083	1,828	2,210	1,649
Diamond, gem	carats	143,982	49,920	52,273	40,764	55,928
Gold, mine output, Au content	kilograms	9,326	9,594	11,293	13,643	14,694
Sand, common		478,572	652,175	674,880	1,478,184	2,334,000
Stone, crushed		340,016	514,932	534,058	483,858	654,995

do. Ditto.

[1] Table includes data available through December 22, 2014.

[2] In addition to the commodities listed, Guyana also produced loam.

Source: Guyana Geology and Mines Commission.

TABLE 2
GUYANA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Bauxite	Bauxite Company of Guyana Inc. (BCGI) (United Company RUSAL Plc, 90%, and Government, 10%)	Kwakwani, East Berbice District	2,000
Do.	Bosai Minerals Group Guyana Inc. (Bosai Minerals Group Company Ltd., 70%, and Government of Guyana, 30%)	Omai bauxite mine and processing plant located near Linden on the Demerara River about 100 kilometers south of Georgetown	2,000
Gold and precious stones	Numerous domestic artisanal operations	Various locations	NA
Gravel	Baracara Quarries (Rahaman Group)	Quarry near Bartica, Mazaruni-Potaro District	100
Silica sand	Minerals and Technology Ltd. [Minerals and Chemicals of Texas (United States)]	Sand Hills, Demerara River, West Demerara District	300
Stone	BK Quarries Inc. (BK International Inc.)	Mazaruni River	3,650

Do., Ditto. NA Not available.

THE MINERAL INDUSTRIES OF THE ISLANDS OF THE CARIBBEAN

ARUBA, DOMINICAN REPUBLIC, JAMAICA, TRINIDAD AND TOBAGO, AND OTHER ISLANDS

By Yadira Soto-Viruet

ARUBA

Mining did not play a significant role in Aruba's economy. In 2013, the country's real gross domestic product (GDP) increased by 3.9% compared with that of 2012. In 2012, the country's economy had been affected by the suspension of operations at Valero Refining Company-Aruba NV's Valero Aruba refinery in late March. Valero Refining Company-Aruba was a subsidiary of Valero Energy Corp. of the United States. In early March 2012, Valero Energy had announced that the 235,000-barrel-per-day refinery was operating far below capacity owing to inadequate profit margins, which was resulting in financial losses. The refinery produced about 9.8 million barrels (Mbbl) of petroleum refinery products and 16,410 metric tons (t) of sulfur (as a byproduct of petroleum production) from January through March 2012, when the refinery closed. During 2013, Valero Aruba continued to function as a storage terminal and employed about 110 people compared with about 555 people in 2012 (Valero Energy Corp., 2012a, b; Centrale Bank van Aruba, 2014a, p. xii; 2014b, p. 1).

According to the Central Bureau of Statistics of Aruba (2014a, b), the value of goods exported from Aruba was about \$168 million[1] in 2013 compared with about \$173 million in 2012 (excludes exports of crude oil and refined petroleum products). Mineral products made only a minor contribution to the country's exports. Aruba's major export trade partners were, in order of value, Colombia (which received 39% of the country's exports), the Dutch Caribbean Islands (formerly known as Netherlands Antilles) (18%), the United States (13%), Venezuela (12%), the Netherlands (5%), and Panama (4%). Exports to the United States were valued at about \$21 million in 2013 compared with about \$22 million in 2012. Aruba's imports were valued at about \$1.3 billion, which was about the same as in 2012, and mineral products accounted for about 8% of the country's imports. The country's major import partners were, in order of value, the United States (which supplied 50% of Aruba's imports), the Netherlands (11%), and the United Kingdom (7%).

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DOMINICAN REPUBLIC

The Dominican Republic's mineral industry was dominated by the production of cement, copper, gold, nickel, and silver. The country was estimated to be the world's 13th-ranked nickel-producing country in 2013 (Kuck, 2014). Other mineral commodities produced in the country included clay, gypsum, limestone, pozzolan, and calcareous and silica sand.

Minerals in the National Economy

The Dominican Republic's GDP increased by 4.1% in 2013 compared with that of 2012. The positive growth in the GDP was attributed to a 157% increase in the output of the mining and quarrying sector and a 7.5% increase in the output of the construction sector. The increase in the mining and quarrying sector was mostly attributed to the commissioning and ramping up of commercial production at Pueblo Viejo Dominicana Corp.'s (PVDC's) Pueblo Viejo gold and silver mine in January. In 2013, the mining and quarrying sector contributed 1.2% of the total value of the GDP compared with 0.5% in 2012. As of October, about 12,664 people were employed in the mining and quarrying sector (Banco Central de la República Dominicana, 2014, p. 2–3, 8, 23).

Production

In 2013, production of gold increased by 536% to 26,083 kilograms (kg) from 4,106 kg in 2012; silver production, by 186% to 78,227 kg from 27,296 kg; travertine, by 41% to 3,039 cubic meters from 2,161 cubic meters; and dolomite, by 33% to 4,000 cubic meters from 3,000 cubic meters. Production of limestone decreased by 61% to 2.0 million cubic meters from 5.1 million cubic meters; marble production, by 59% to 2,444 cubic meters from 6,014 cubic meters; gypsum, by 44% to 65,005 cubic meters from 116,181 cubic meters; nickel contained in ferronickel, by 38% to 9,400 t from 15,186 t; clays, by 35% to 100,597 cubic meters from 154,693 cubic meters; nickel ore, by 15% to 1.1 million metric tons (Mt) from 1.3 Mt; and copper, by 12% to 10,379 t from 11,737 t. Data on mineral production are in table 1.

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[1] Where necessary, values have been converted from Aruban florins (AWG) to U.S. dollars (\$) at an annual average exchange rate of AWG0.56=\$1.00 for 2012 and 2013.

Structure of the Mineral Industry

Table 2 lists major mineral industry facilities in the country.

Mineral Trade

Based on preliminary statistics by the Banco Central de la República Dominicana (2014, p. 27, 66), the country's exports increased by 5.5% to $9.6 billion in 2013 compared with about $9.1 billion in 2012. In 2013, the Dominican Republic exported 26,091 t of ferronickel valued at $157.3 million compared with 40,116 t valued at $267.3 million in 2012, which reflected a 9.4% decrease in the price per ton in 2013. The country also exported 78,129 kg of silver compared with 25,184 kg in 2012 and 27,022 kg of nonmonetary gold compared with 3,236 kg in 2012.

The country's exports to the United States were valued at about $4.2 billion in 2013 compared with about $4.4 billion in 2012. These included about $154 million worth of nonmonetary gold and about $66 million worth of liquefied petroleum gases. Imports from the United States were valued at about $7.2 billion compared with about $6.9 billion in 2012; these included about $739 million in fuel oil, $343 million in natural gas liquids, $307 million in petroleum products, and $53 million in excavating machinery (U.S. Census Bureau, 2014a, b).

Commodity Review

Metals

Copper.—Perilya Ltd. of Australia, through its subsidiary Corporacion Minera Dominicana, owned and operated the Cerro de Maimon copper, gold, and silver mine, which is located in Maimon municipality, Monseñor Nouel Province, about 70 kilometers (km) northwest of the capital city of Santo Domingo. The Cerro de Maimon deposit is a strata-bound copper- and zinc-rich exhalative volcanogenic massive-sulfide lens with a gold-and-silver-bearing oxide cap. As of the third quarter of 2013, the mine had produced about 7,954 t of copper, 329 kg of gold, and 7,310 kg of silver. In June 2012, the combined oxide and sulfide mineral resources at Cerro de Maimon were estimated to be 13 Mt at average grades of 24.33 grams per metric ton (g/t) silver, 1.5% copper, 1.3% zinc, and 0.76 g/t gold. The plant at Cerro de Maimon had a primary crushing and conveying system for both the sulfide and oxide ores. The sulfide ore was processed through primary and secondary ball mills and a flotation circuit to produce the copper concentrate. The oxide ore was processed through a ball mill and a conventional cyanide-leaching unit to recover gold and silver (Perilya Ltd., 2012; 2013a, p. 17, 19; 2013b, c).

Gold.—PVDC was owned jointly by the Canadian companies Barrick Gold Corp. (60% interest) and GoldCorp Inc. (40% interest). The Pueblo Viejo open pit mine, which was located about 100 km northwest of Santo Domingo, began commercial production in January. In 2013, gold production was about 23,000 kg, and proven and probable reserves at Pueblo Viejo were estimated to be 457,960 kg of contained gold, 2.9 million kilograms of contained silver, and 171,900 t of contained copper. In the third quarter of 2013, PVDC announced that it had reached an agreement with the Government concerning proposed amendments to PVDC's special lease agreement. The proposed amendments would increase the Government revenues to a 50–50 split (between the Government and PVDC) of the expected cash flows from the mine from 2013 to 2016. The amendments would also provide tax revenues to the Government, which were projected to be about $2.2 billion from 2013 to 2016; an extension of the period during which PVDC could recover its capital investment; the establishment of a graduated minimum tax rate, which would be adjusted based on future metal prices; and the following parameters: a corporate income tax rate of 25%, a net smelter royalty of 3.2%, and a net profits tax of 28.75%. PVDC expected to produce about 32,000 kilograms per year of gold in the first 5 years of the mine's 25-year life (Barrick Gold Corp., 2013a, b; 2014; GoldCorp Inc., 2013; 2014a, b).

At least three Canadian companies were engaged in gold exploration in the Dominican Republic. Exploration was underway at the Romero and the Tireo projects by Gold Quest Mining Corp.; in the areas of Cuance and Los Hojanchos, Jobo Claro, La Cueva, Loma Hueca, Maimon, and Pueblo Viejo by Everton Resources Inc.; and at the Neita concession by Unigold Inc.

Nickel.—Falconbridge Dominicana S.A. (Falcondo) was jointly owned by Glencore Xstrata plc of Switzerland (85.3%), the Government of the Dominican Republic (10%), Franco-Nevada Corp. of the United States (4.1%), and a private interest (0.6%). Falcondo, which is located in Loma La Peguera, Bonao, had the capacity to produce 29,000 metric tons per year (t/yr) of nickel contained in ferronickel and an estimated mine life of 22 years. As of December 31, the measured and indicated resources at Falcondo were estimated to be 71.5 Mt at an average grade of 1.47% nickel and the inferred mineral resources were estimated to be 4.9 Mt at an average grade of 1.4% nickel. Total proven and probable reserves were estimated to be 70.8 Mt at an average grade of 1.31% nickel (Glencore Xstrata plc, 2014, p. 36).

In 2012, the Government had responded to protests concerning continued exploration by Glencore Xstrata in the Loma Miranda area of the Falcondo site. In May, the United Nations Development Programme (UNDP) rejected the company's environmental impact study for the Falcondo Loma Miranda area (submitted to the UNDP in January), stating that the study was incomplete and failed to consider the social and environmental impacts of extraction at the mine. In June, the

Government denied a mining permit for the company's Loma Miranda area, citing concerns regarding possible environmental damage. In October, Falcondo was placed on care-and-maintenance status owing to low nickel prices. Falcondo was expected to remain on care-and-maintenance status for up to 3 years (Jimenez, 2013; Stringer, 2013; Glencore Xstrata plc, 2014, p. 36).

Outlook

The Dominican Republic was forecast to have a GDP growth rate of 4.0% for 2014 (International Monetary Fund, 2014, p. 185). The value of the mining and quarrying sector is expected to increase in 2014 owing to expected increases in gold and silver production, which are likely to provide a significant source of revenue to the Government. In the long run, gold exploration activities in the country are likely to attract foreign direct investment and increase interest in nonfuel mineral prospecting.

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JAMAICA

Jamaica's mineral industry was dominated by bauxite and alumina production. In 2013, the country was estimated to be the world's seventh-ranked producer of bauxite, accounting for about 4% of world production (Bray, 2014). Other mineral commodities produced in the country included gypsum, lime, limestone, pozzolan, sand and gravel, shale, and silica sand.

Minerals in the National Economy

In 2013, Jamaica's GDP increased by 0.2% compared with that of 2012. In 2013, mining and quarrying made up about 2.3% of the GDP. The value of output in the mining and quarrying sector increased by 3.8% in 2013; the growth was attributed to a 2.4% increase in bauxite production and a 5.5% increase in alumina production. Cement production increased by 8.5% in 2013, which was attributed to an increase in the construction of residential and nonresidential projects. In 2013, 5,400 people were employed in the mining, quarrying, and refining industries compared with 4,900 people in 2012 (Bank of Jamaica, 2014a, p. 43–44, 46, 48; 2014b, c).

Production

In 2013, lime production increased by 26% to 106,281 t from 84,264 t in 2012, and silica sand production, by 13% to 15,824 t from 13,945 t. Sand and gravel production decreased by 27% to 1.9 Mt from 2.6 Mt; gypsum production, by 25% to 48,322 t from 64,753 t; and limestone, by 13% to 1.9 Mt from 2.2 Mt (table 1).

Structure of the Mineral Industry

Bauxite was produced by Alumina Partners of Jamaica (Alpart), Jamaica Aluminum Co. (Jamalco), St. Ann Bauxite Jamaica Ltd., and West Indies Alumina Co. (Windalco).

These companies had a combined bauxite production capacity of about 16.2 million metric tons per year (Mt/yr). Alpart, Jamalco, and Windalco also produced alumina; the companies had a combined production capacity of about 4.8 Mt/yr. Table 2 lists major mineral industry facilities operating in the country.

Operations at Alpart's refinery and Windalco's Kirkvine Works refinery were suspended in 2009 owing to low market prices and high production costs. Alpart's refinery was located in Nain, St. Elizabeth, and had the capacity to produce about 2.0 Mt/yr of alumina. Kirkvine Works was located in Manchester and had the capacity to produce about 610,000 t/yr of alumina. United Company RUSAL Plc (RUSAL) held 100% interest in Alpart and a 93% interest in Windalco in joint venture with the Government. In April, RUSAL announced that it would begin its modernization program at its Alpart and Windalco refineries, which would include a shift from fuel oil to natural gas as the main energy source. The refineries were expected to resume operations by 2016 (Helps, 2013; United Company RUSAL Plc, 2013; 2014, p. 14–15).

Mineral Trade

In 2013, the total value of goods exported from Jamaica was about $1.6 billion compared with about $1.7 billion in 2012. Bauxite and alumina accounted for about 41% of the total value of exports. The total value of goods imported into Jamaica was about $5.6 billion compared with about $5.9 billion in 2012 (Bank of Jamaica, 2014a).

Jamaica's exports to the United States were valued at about $421 million in 2013 compared with about $507 million in 2012. About 30% of these exports was bauxite and aluminum valued at about $126 million and about 17% was coal and related fuels valued at about $72 million. Imports from the United States were valued at about $2 billion in 2013, which was about the same as in 2012 and included nearly $397 million worth of fuel oil and about $110 million worth of petroleum products (U.S. Census Bureau, 2014a, b).

Commodity Review

Mineral Fuels

Petroleum.—Petrojam Ltd. was owned jointly by the Government and Petroleos de Venezuela S.A. The Petrojam refinery is located in Kingston Port and had a capacity to produce about 30,000 barrels per day (bbl/d). In June, the Government announced its modernization and expansion plans for the Petrojam refinery, which would increase the production capacity to 50,000 bbl/d; the modernization and expansion project was expected to be completed by 2016 (Jamaica Observer, 2013a, b).

Outlook

Jamaica was forecast to have a GDP growth rate of 1.1% for 2014 (International Monetary Fund, 2014, p. 189). Bauxite and alumina will most likely remain the leading mineral products in terms of production value. The reopening of the Alpart and the Kirkvine Works alumina refineries and the expansion plans at the country's petroleum refinery are likely to help strengthen Jamaica's economy in the long run.

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TRINIDAD AND TOBAGO

In 2013, the mineral industry of Trinidad and Tobago relied upon production from its hydrocarbon sector and the production and manufacturing of iron and steel. As of January, the country was known to have 42 licensed active quarries, among which were 29 sand and gravel quarries and 8 limestone quarries. Andesite was the primary material quarried in Tobago (table 2; Ministry of Energy and Energy Affairs, 2013, 2014a).

Minerals in the National Economy

In 2013, Trinidad and Tobago's GDP increased by 1.6% compared with that of 2012. Based on preliminary statistics by the Central Bank of Trinidad and Tobago (2014, p. 7, 18), the petroleum sector accounted for about 49% of the GDP. As of March 2013, about 112,000 workers were employed in the construction sector (included electricity and water), which accounted for about 17.7% of the workforce in the country; about 52,000 workers were employed in the manufacturing sector (included mining and quarrying), which accounted for about 8.2% of the total workforce; and about 21,300 workers were employed in the petroleum and natural gas sector, which accounted for about 3.4% of the total workforce (Central Bank of Trinidad and Tobago, 2014, p. 18; International Monetary Fund, 2014, p. 185).

Production

In 2013, the output of petroleum refinery products increased by 23% to 48 Mbbl from 39 Mbbl in 2012. The increase in production was mostly attributable to the return of production at the Pointe-a-Pierre refinery to near full capacity in mid-2013. Cement production increased by 23% to 801,600 t from 654,100 t in 2012; the increase was attributable to the implementation of Government programs in the construction sector (table 1).

Structure of the Mineral Industry

State-owned Petroleum Company of Trinidad and Tobago Ltd. (Petrotin) owned the only petroleum refinery in the country; the refinery was located in Pointe-a-Pierre and had the capacity to produce about 168,000 bbl/d. Natural gas liquids were produced by Phoenix Park Gas Processors Ltd., which was 51% owned by state-owned National Gas Company of Trinidad and Tobago. Ammonia was produced at the Ammonia-Urea Ammonium Nitrate-Melamine (AUM) complex [owned by Methanol Holdings (Trinidad) Ltd.]; by Caribbean Nitrogen Co. and at the Nitrogen 2000 plant (both owned by a consortium of EOG Resources Trinidad Ltd., KOCH Industries, Man Ferrostaal, and Proman Group); by PCS Nitrogen (Trinidad) Ltd. (wholly owned by Potash Corp. of Saskatchewan, Inc.); by Point Lisas Nitrogen Ltd. (a joint venture between CF Industries Holdings Inc. and KOCH Fertilizer LLC); by Trinidad Nitrogen Co. Ltd. (a joint venture between the Government and Yara International ASA); and by Yara Trinidad Ltd. (wholly owned by Yara International ASA). These companies had a combined ammonia production capacity of about 6.1 Mt/yr (table 2).

Mineral Trade

In 2013, the total value of Trinidad and Tobago's exports was about $12.8 billion compared with $13.0 billion in 2012. The total value of Trinidad and Tobago's imports was about $8.8 billion compared with $9.1 billion in 2012. Crude oil and refined petroleum products accounted for about 37% of the total value of the country's exports in 2013. Exports of crude oil totaled about 12.4 Mbbl compared with 10.5 Mbbl in 2012; methanol, 5.7 Mt compared with 5.5 Mt; natural gas liquids, 12.6 Mbbl compared with 11.5 Mbbl; and petroleum products, 37.2 Mbbl compared with 32.4 Mbbl. The country exported about 1.0 Mt of direct-reduced iron, 230,500 t of billets, and 278,300 t of wire rod. In 2013, cement exports increased by 6% to 196,200 t compared with 185,300 t in 2013 (Central Bank of Trinidad and Tobago, 2014, p. 59–60, 88).

Trinidad and Tobago's exports to the United States were valued at about $6.5 billion in 2013 compared with about $8.1 billion in 2012. Fuel oil accounted for about $1 billion of these exports; natural gas, about $891 million; and semifinished iron and steel mill products, about $641 million. Imports from the United States were valued at about $2.4 billion in 2013 compared with about $2.5 billion in 2012; these included about $170 million in drilling and oilfield equipment and $89.5 million in petroleum products (U.S. Census Bureau, 2014a, b).

Commodity Review

Mineral Fuels

Petroleum.—On August 17, the Ministry of Energy and Energy Affairs opened its 2013 deepwater competitive bidding round for six offshore blocks. The offshore blocks, which were located in the east coast marine area and the Trinidad and Tobago Deep Atlantic Area, would be leased under production-sharing contract agreements. The deadline for submitting the bids was extended to March 28, 2014 (Ministry of Energy and Energy Affairs, 2015).

Outlook

Trinidad and Tobago was forecast to have a GDP growth rate of 2.2% for 2014 (International Monetary Fund, 2014, p. 185). In the short run, offshore exploration activities are likely to attract foreign investment in the mineral fuel sector. Cement production is likely to increase owing to the increase in the country's construction activity. The energy sector is expected to remain important to the long-term economic growth of the country and to contribute to Government revenues and export earnings (Ministry of Energy and Energy Affairs, 2014b).

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OTHER ISLANDS OF THE CARIBBEAN

The economies of the other islands of the Caribbean did not depend upon domestic mineral production for purposes of trade or economic growth, and mineral production data were not available.

TABLE 1

ISLANDS OF THE CARIBBEAN: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Country and commodity		2009	2010	2011	2012	2013
DOMINICAN REPUBLIC[3, 4]						
Cement, hydraulic		3,852,176	4,105,657	3,996,500	4,130,000	4,250,000 [e]
Clay	cubic meters	229,478	51,250	17,050	154,693 [r]	100,597
Copper, mine output, Cu content		12,937	10,015	11,777	11,737	10,379
Gold, mine output, Au content	kilograms	425	533	495	4,106	26,083
Gypsum	cubic meters	67,928	53,800	31,177	116,181 [r]	65,005
Nickel, Ni content:						
Mine output, laterite ore		500	--	1,143,000	1,301,694	1,100,000 [e]
Metal, Ni contained in ferronickel, smelter		--	--	13,498	15,186	9,400 [5]
Sand:						
Calcareous	cubic meters	206,000	163,000	27,500	32,700	33,000 [e]
Silica	do.	4,000	19,652	20,518	25,581	26,000 [e]
Silver, mine output, Ag content	kilograms	23,119	22,815	18,169	27,296	78,227
Stone:						
Dolomite	cubic meters	4,000	3,500	3,000	3,000	4,000
Limestone	do.	2,168,958	2,123,317	2,619,099	5,096,936 [r]	1,993,825
Marble	do.	3,678	5,336	6,137	6,014	2,444
Pozzolan	do.	71,957	101,311	91,933	76,366	76,400 [e]
Travertine	do.	3,028	324	1,001	2,161	3,039
JAMAICA[6, 7]						
Bauxite and alumina:						
Bauxite, dry equivalent, gross weight	thousand metric tons	7,817	8,540	10,190	9,290 [r]	9,510
Alumina	do.	1,774	1,591	1,960	1,758	1,855
Cement, hydraulic		736,560 [r]	723,489 [r]	766,274 [r]	760,300	824,893
Gypsum		156,900 [r]	147,103 [r]	79,521 [r]	64,753 [r]	48,322
Lime		--	73,980	79,250	84,264	106,281
Petroleum refinery products	thousand 42-gallon barrels	8,265	8,146	8,592	8,400 [r]	8,000
Sand and gravel	thousand metric tons	--	2,750	2,475	2,599	1,902
Silica sand		6,800	12,964	13,965	13,945	15,824
Stone:						
Limestone	thousand metric tons	1,914	1,956	2,451	2,233	1,949
Pozzolan	do.	132	140	130	107	112
TRINIDAD AND TOBAGO[8, 9]						
Cement, hydraulic		870,000	790,900	827,000	654,100 [r]	801,600
Iron and steel:						
Direct-reduced iron		1,181,700	1,751,800	1,705,600	1,684,300 [r]	1,749,700
Steel, crude[10]		417,000	572,000	603,500 [r]	624,000 [r]	615,800
Fertilizers	thousand metric tons	6,167	6,262	5,715	5,453	5,129

See footnotes at end of table.

TABLE 1—Continued

ISLANDS OF THE CARIBBEAN: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Country and commodity		2009	2010	2011	2012	2013
TRINIDAD AND TOBAGO—Continued						
Methanol	thousand metric tons	6,111	5,932	5,904	5,491	5,633
Natural gas, gross	million cubic meters	43,234 [r]	44,640 [r]	42,883	42,603 [r]	42,244
Natural gas liquids	thousand 42-gallon barrels	15,899	17,223	16,043	12,890 [r]	12,573
Nitrogen, N content of anhydrous ammonia		4,945,900	5,553,242	5,444,300	4,466,000	4,640,000
Petroleum:						
Crude	thousand 42-gallon barrels	38,966 [r]	35,837 [r]	33,550	29,915 [r]	29,617
Refinery products	do.	53,300	46,167	50,098	39,060 [r]	48,177
Urea		700,000	708,760	616,247	521,000	490,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1] Table includes data available through August 20, 2014.

[2] The countries and (or) Departments of Aruba, The Bahamas, Barbados, Dominica, Martinique, and Saint Kitts and Nevis are known to produce mineral commodities, including aragonite, cement, lime, limestone, petroleum refinery products, pumice, salt, sand and gravel, stone, and sulfur, but production data have not been available for a number of years and production volumes have been so small relative to global totals that reliable production estimates can no longer be made.

[3] In addition to the commodities listed, the Dominican Republic also produces petroleum refinery products.

[4] Source: Mineral Questionnaire 2012–2013 by the Dirección General de Minería, Sub-Dirección Minera y de Catastro, Sección de Estadística.

[5] Source: Glencore Xstrata plc.

[6] In addition to the commodities listed, Jamaica also produces clay, marble, marl, and shale.

[7] Source: Mineral questionnaire 2012–2013 by the Jamaican Ministry of Science, Technology, Energy and Mining, Mines and Geology Division.

[8] In addition to the commodities listed, Trinidad and Tobago also produces limestone, secondary refined lead, and sulfur (byproduct of petroleum).

[9] Source: Central Bank of Trinidad and Tobago.

[10] Based on billet production.

TABLE 2
ISLANDS OF THE CARIBBEAN: STRUCTURE OF THE MINERAL INDUSTRIES IN 2013

(Metric tons unless otherwise specified)

Country and commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
ARUBA				
Petroleum, refinery	42-gallon barrels per day	Valero Aruba Refinery (Valero Energy Corp.)	Southern Aruba	235,000 [1]
BAHAMAS, THE				
Petroleum, refinery	thousand 42-gallon barrels	Bahamas Oil Refining Company International Ltd. (BORCO) (Buckeye Partners L.P., 80%)	Storage facilities, Freeport	21,500
BARBADOS				
Cement		Arawak Cement Company Ltd. (Trinidad Cement Ltd.)	Checker Hall, Saint Lucy	360,000
DOMINICAN REPUBLIC				
Copper		Corporación Minera Dominicana (Perilya Ltd.)	Maimon, Monseñor Nouel	15,000
Gold	kilograms	do.	do.	600
Do.	do.	Barrick Gold Corp., 60%, and Goldcorp Inc., 40%	Pueblo Viejo	32,000
Do.	do.	Las Lagunas Project (PanTerra Gold. Ltd.)	Las Lagunas	1,600 [2]
Nickel		Falconbridge Dominicana S.A (Glencore Xstrata, 85.3%; Government, 10%; Franco-Nevada Corp., 4.1%; private interests, 0.6%)	Loma Las Peguera, Bonao	29,000 [3]
Petroleum, refinery	42-gallon barrels per day	Refinería Dominicana de Petróleo S.A. (Government, 51%, and Petróleos Venezuela S.A., 49%)	Haina Port	34,000
Silver	kilograms	Corporación Minera Dominicana (Perilya Ltd.)	Maimon, Monseñor Nouel	15,000
Do.	do.	Las Lagunas Project (PanTerra Gold. Ltd.)	Las Lagunas	14,000 [2]
JAMAICA				
Alumina		Alumina Partners of Jamaica (Alpart) (United Company RUSAL Plc, 100%)	Refinery, Nain, St. Elizabeth	2,000,000 [1]
Do.		Jamaica Aluminum Co. (Jamalco) (Alcoa Minerals of Jamaica, 55% and Government, 45%)	Refinery at Halse Hall, Clarendon	1,478,000
Do.		West Indies Alumina Co. (Windalco) (United Company RUSAL Plc, 93%, and Government, 7%)	Ewarton Works refinery, Saint Catherine	670,000
Do.		do.	Kirkvine Works refinery, Manchester	610,000 [1]
Bauxite		Alumina Partners of Jamaica (Alpart) (United Company RUSAL Plc, 100%)	Nain, St. Elizabeth	5,000,000
Do.		Jamaica Aluminum Co. (Jamalco) (Alcoa Minerals of Jamaica, 55% and Government, 45%)	Manchester	1,800,000
Do.		St. Ann Bauxite Jamaica Ltd. (Noranda Aluminum Holding Corp., 49%, and Government., 51%)	St. Ann	5,400,000
Do.		West Indies Alumina Co. (Windalco) (United Company RUSAL Plc, 93%, and Government, 7%)	Russell Place and Schwallenburgh	4,000,000
Petroleum, refinery	42-gallon barrels per day	Petrojam Ltd. (Government, 51%, and Petróleos de Venezuela S.A., 49%)	Kingston Port	30,000
TRINIDAD AND TOBAGO				
Ammonia		Ammonia-Urea Ammonium Nitrate-Melamine (AUM) complex [Methanol Holdings (Trinidad) Ltd.]	Point Lisas Industrial Estate	650,000
Do.		Caribbean Nitrogen Co. (a consortium of EOG Resources Trinidad Ltd., KOCH Industries, Man Ferrostaal, and Proman Group)	do.	650,000
Do.		Nitrogen2000 plant (a consortium of EOG Resources Trinidad Ltd., KOCH Industries, Man Ferrostaal, and Proman Group)	do.	650,000
Do.		PCS Nitrogen (Trinidad) Ltd. (Potash Corporation of Saskatchewan, Inc., 100%), including Plant 1, Plant 2, Plant 3, and Plant 4	do.	2,200,000
Do.		Point Lisas Nitrogen Ltd. (CF Industries Holdings Inc, 50%, and KOCH Fertilizer LLC, 50%)	do.	650,000

See footnotes at end of table.

TABLE 2—Continued
ISLANDS OF THE CARIBBEAN: STRUCTURE OF THE MINERAL INDUSTRIES IN 2013

(Metric tons unless otherwise specified)

Country and commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
TRINIDAD AND TOBAGO—Continued				
Ammonia—Continued		Trinidad Nitrogen Co. Ltd. (Tringen I and II) (Government, 51%, and Yara International ASA, 49%)	Point Lisas Industrial Estate	1,000,000
Do.		Yara Trinidad Ltd. (Yara International ASA, 100%)	do.	300,000
Clay		Trinidad Aggregate Products Ltd.	Depot Road, Longdenville	NA
Iron and steel		ArcelorMittal Steel Point Lisas Ltd. (ArcelorMittal, 100%), of which:	Point Lisas Industrial Estate	4,100,000
		Direct-reduced iron pellets		(2,700,000)
		Billets		(700,000)
		Wire rods		(700,000)
Limestone, blue		Cumaca Blue Limestone Products Ltd.	Cumaca Road, Valencia	NA
Do.		Cumana Enterprise Ltd.	Toco Road, Cumana	NA
Do.		Harripersad Dookeran	Quarry Road, Guaracara	NA
Do.		Hermitage Limestone Ltd.	Tumbason Road, Arima	NA
Do.		RRJ Ltd.	Tabaquite Road, Guaracara	NA
Do.		Saiscon Ltd.	Corosal Road, Mayo	NA
Do.		Springbank Quarry Ltd.	Heights of Guanapo, Arima	NA
Do.		St. Alban's Sand and Gravel Co. Ltd.	Cumaca Road, Cumaca	NA
Liquefied natural gas		Train 1 [BP (Barbados) Holding SRL, 34%; BG Atlantic 1 Holding Ltd., 26%; Shell LNG Port Spain BV, 20% NGC Trinidad and Tobago LNG Ltd., 10%; Summer Soca LNG, 10%]	Point Fortin	3,000,000
Do.		Trains 2 and 3 (BP Train 2/3 Holding SRL, 42.5%; BG 2/3 Investment Ltd., 32.5%; Shell LNG Port Spain BV, 25%)	do.	6,600,000
Do.		Trains 4 [BP (Barbados) Holding SRL, 37.78%; BG Atlantic 4 Holdings ltd., 28.89%; Shell LNG Port Spain BV, 22.22%; Trinidad and Tobago LNG, 11.11%]	do.	5,200,000
Methanol		Atlas plant (Methanex Corp., 63.1%)	Point Lisas Industrial Estate	1,700,000
Do.		Titan plant (Methanex Corp., 100%)	do.	850
Do.		Methanol Holdings (Trinidad) Ltd., of which:	do.	4,800,000
		Plant 1		(480,000)
		Plant 2		(550,000)
		Plant 3		(570,000)
		Plant 4		(580,000)
		Plant 5		(1,900,000)
Natural gas liquids	42-gallon barrels per day	Phoenix Park Gas Processors Ltd. (National Gas Company of Trinidad and Tobago, 51%)	Port of Savonetta	70,000
Sand and gravel		29 quarries	Matura, Sangre Grande, Turure, and Valencia	NA
Petroleum:				
Refinery	42-gallon barrels per day	Petroleum Company of Trinidad and Tobago Ltd. (Petrotin) (Government, 100%)	Pointe-a-Pierre	168,000
Crude	do.	Greater Angostura (BHP Billiton Ltd., 45%; Total S.A., 30%; Chaoyang, 25%	Greater Angostura oilfield	100,000
Urea	metric tons	PCS Nitrogen Trinidad Ltd. (Potash Corporation of Saskatchewan, Inc., 100%)	Point Lisas Industrial Estate	748,000
Do.	do.	Ammonia Urea Nitrate Melamine (AUM) complex (Methanol Holdings Ltd.)	do.	NA

Do., do. Ditto. NA Not available.

[1] Operations suspended.

[2] Las Lagunas project involves the reprocessing of gold and silver refractory tailings from previous operations at the Pueblo Viejo Mine. The project began operations in 2012.

[3] Placed on care-and-maintenance status in October 2013.

THE MINERAL INDUSTRY OF MEXICO

By Alberto Alexander Perez

In 2013, Mexico's economy was affected by a decrease in demand for its exports, particularly mineral commodity exports. According to the World Bank, Mexico's real gross domestic product (GDP) was $1.261 trillion, which was about a 1.1% increase from that of 2012, reflecting a slowdown in the Mexican economy in response to world economic conditions in 2013 (World Bank The, 2015).

In 2013, Mexico was a significant world producer of several mineral commodities. The country was the world's leading producer of silver, by volume, with a 19% share of world production; the 2d-ranked producer of fluorspar (18%), and bismuth (9.8%); the 3d-ranked producer of wollastonite (excluding the United States) (10%), the 4th-ranked producer of cadmium (6.8%); the 5th-ranked producer of lead (3.8%) and molybdenum (4.7%), the 6th-ranked producer of diatomite (3.8%) and zinc (4.8%); the 7th-ranked producer of salt (4.1%) and graphite (0.6%); the 8th-ranked producer of gold (3.5%); the 9th-ranked producer of gypsum (2.1%); and the 11th-ranked producer of manganese (1.3%) and copper (2.6%) (Camara Minera de Mexico, 2014, p. 113; Bolen, 2015; Brininstool, 2015; Corathers, 2015; Crangle, 2015a, b; George, 2015; Guberman, 2015; Katrivanos, 2015a, b; McRae, 2015a, b; Olson, 2015; Polyak, 2015; Tolcin, 2015a, b; Virta, 2015).

Minerals in the National Economy

Exports of mineral commodities (excluding hydrocarbons) were an important source of foreign currency for the country and were exceeded only by exports from the automobile and electronics industries and by crude oil exports in 2013. Net exports, however, decreased by 18.2% compared with those of 2012, generating $10.35 billion in 2013 (Secretaria de Economia, 2014, p. 12).

In 2013, mineral and metal processing accounted for 8.5% of the mineral industry's share of Mexico's GDP and 2.9% of Mexico's total GDP. The value of the mineral industry's contributions to the GDP increased by 6.8% from that of 2012, reaching the highest level ever at $23.012 billion. Employment in the mineral industry increased by 18,833 to a total of 332,501 employees (Camara Minera de Mexico, 2014, p. 9–10).

Of the total mineral industry production in Mexico in 2013, gold accounted for 26%, by value, followed by silver (21.6%), copper (17.1%), zinc (4.6%), sand (3.9%), iron ore (3%), gravel (2.8%), and other minerals accounted for the remaining 21% (Secretaria de Economia, 2014, p. 12).

Government Policies and Programs

Changes in Mexico's policies and incentive structure in the mineral industry in 2013 were intended to have a positive effect on the industry in the near future. After long deliberation by the Mexican national assembly, reforms to the hydrocarbon laws were introduced, and although the national oil company Petróleos Mexicanos S.A. de C.V. (PEMEX) was not privatized, significant reforms to its structure and functioning were debated and approved by December 2013. These reforms, which were to begin in August 2014, would allow the Government to issue contracts to private companies, regardless of whether they are associated with PEMEX, for exploration and extraction of hydrocarbons. The law, however, still specifies that hydrocarbons remain the property of the state. A notable change was the opening of the primary petrochemical industry, which previously was designated exclusively to PEMEX by law, to private companies for the refining of crude petroleum, the manufacture of petrochemicals, and the processing of natural gas (Gobierno de la Republica, 2015, p. 6–9).

The Ley de la Commission Nacional de Hidrocarburos [Law of the National Commission on Hydrocarbons] regulates and details the rules regarding the exploration for and extraction and exploitation of crude oil and associated commodities, with the exception of gas produced from coal (Gobierno de la Republica, 2015, p. 6–9).

The laws that regulate the mineral sector (excluding hydrocarbons) also had changes introduced in 2013. In particular, there were increases to the taxes on the income of mineral production (impuesto sobre la renta), and a tax labeled "Special tax over production and services" (Impuesto especial sobre produccion y Servicios), which taxes a small set of designated products, such as gasoline and other energy products that the mineral industry uses. The changes that would likely have a considerable effect were the elimination of the deduction of investment costs and the 100% deduction of exploration expenses from the taxes owed to the state by mineral companies (Camara Minera de Mexico, 2014, p. 11).

The mineral sector is administered by the Secretaria de Economia. The Direccion General de Minas is the organization in charge of making revisions to the Mining Law and its regulations, as well as granting concessions and titles. Mineral commodities are considered part of the national patrimony of Mexico under its Constitution. Article 27 deals with issues of ownership and exploitation of natural resources; however, the Mining Law that became effective in 1992 and was modified and expanded in 1996, in April 2005, and in June 2006, clarifies and spells out the legal framework for the exploration, production, and processing of the country's mineral resources. Crude oil exploitation is not covered by this law, and only the exploitation of gas produced from underground coal is covered by this law (Camara de Diputados del H. Congreso de la Union, 2013, p. 1–9).

In October 2012, the Reglamento de la ley Minera [Rules of the Mining Law] was published in the Diario Oficial of the Mexican Congress. These rules explain how the Mining Law is to be applied and the procedures to follow. The rules had been discussed and revised over the past several years and were part of a series of reforms intended to streamline governmental procedures in the mineral industry (Camara de Diputados del H. Congreso de la Union, 2012, p. 1–37).

The Mining Law allows a 100% private equity ownership stake in the exploration, production, and development of mineral resources, including resources previously reserved for direct Government exploitation, such as coal, iron ore, phosphorus, potassium, and sulfur. Neither oil and its derivatives nor radioactive materials are covered by this law. Exploration concessions are granted for 6 years and are not renewable. Production concessions are awarded for 50 years and are renewable for an additional 50 years (Camara de Diputados del H. Congreso de la Union, 2006, p. 1–33).

Another important law concerning Mexico's natural resources is the Law of Foreign Investment. This law regulates the degree and form of foreign investment in Mexico, and, in particular, in the natural resources sector, which is an area that previously barred foreign investment and ownership. This law was published in 1993 and has been revised and amended by decrees in 1995, 1996, 1998, 1999, and, most recently, in 2000. In particular, Articles 10 through 14 deal with foreign investment in the mineral sector and the development and exploitation of geographic areas considered restricted by the Government (Camara de Diputados del H. Congreso de la Union, 2012, p. 1–34).

The General Law of Ecological Balance and Environmental Protection (LGEEPA), which is the keystone of the country's environmental law, was passed in 1988. Those environmental responsibilities that had resided in various Government agencies were transferred to the Secretaria de Medio Ambiente, Recursos Naturales y Pesca (SEMARNAP) in 1994. In 2000, the agency became the Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT). Under SEMARNAT, mineral exploration and mining require a number of environmental permits and authorizations to conform to the statutes of the LGEEPA. These requirements include a preliminary environmental impact statement for all major activities of the projects. The SEMARNAT also requires all mines and plants to have an operating license, as well as permits for explosives, hazardous materials handling, land use, water discharge, and well use. Other regulations are concerned with dumps and tailings, electrical transformers, gas and dust emissions, noise, and the storage of oil and fuel. A regulation concerning environmental impact statements was initiated in 2000. Under these rules, environmental impact reports for beneficiation plants, gas and oil pipelines, and mines must be approved by the SEMARNAT (Secretaria de Medio Ambiente y Recursos Naturales, 2008).

Production

In 2013, mineral production in Mexico had mixed results compared with mineral production in 2012, and the change was owing to the decrease in prices of many of the commodities that Mexico produced.

Commodities that had major increases in production included dolomite (315%), kaolin (132%), celestite (47%), metallurgical-grade fluorspar (44%), barite, (42%), fuller's earth (33%), gold content of mine ore (15%), and silver content of mine ore (9%) (table 1). Commodities that had significant decreases in production in 2013 were feldspar (57%), bentonite (35%), acid-grade fluorspar (32%), refined gold (8%), and mine output of copper (7%) (table 1).

Structure of the Mineral Industry

A few large domestic companies produced a significant portion of Mexico's mineral output, including Cementos Mexicanos S.A.B. de C.V. (CEMEX), Compañia Minera Autlan S.A.B. de C.V. (Minera Autlan), Minera Frisco S.A.B de C.V. (Frisco), Fresnillo plc., Grupo Acerero del Norte S.A. de C.V. (GAN), Grupo Mexico S.A.B. de C.V. (Grupo Mexico), and Industrias Peñoles S.A.B. de C.V. (Peñoles). Medium- and small-size companies produced many of the industrial minerals. State-owned PEMEX controlled the crude petroleum, refining, and natural gas production sector (table 2).

The Secretaría de Economía reported that, in 2013, a total of 266 companies were involved in 870 projects in Mexico that had received direct foreign investments. Of the companies making direct foreign investments, 185 had their central offices in Canada and 44 were headquartered in the United States; 9, in China; 6, in Japan; 4 each, in Australia, the Republic of Korea, and the United Kingdom; 2, in India and Chile; and 1 each, in Belgium, Brazil, Italy, Luxembourg, Peru, and Spain. Precious metals, particularly gold and silver, were the primary targets for 573 of the projects, and polymetallic projects numbered 117. Copper and iron ore accounted for 100 and 49 projects, respectively, and the remainder were diverse projects involving various mineral commodities (Secretaria de Economia, 2014, p 622–624).

Mineral Trade

In 2013, Mexico was a net exporter of nonfuel minerals, in terms of value, registering a trade surplus of $10.35 billion, which was a decrease of 18.2% compared with that of 2012 (Camara Minera de Mexico 2014, p. 10). Mexico's principal export partners were the United States and Canada (both of which were fellow members of the North America Free Trade Agreement), as well as Spain. Mexico's share of exports to these countries was 78.4%, 2.9%, and 1.7%, respectively. Mexico's principal import partners were the United States, China, and Japan, which supplied 49.7%, 15.5%, and 4.6%, respectively, of Mexico's total imports. Nine Chinese companies had investments in Mexico's mineral industry, and China was becoming increasingly important as a destination for Mexico's mineral exports (United Nations Statistical Division, 2015).

Commodity Review

Metals

Copper.—In 2013, the volume of mined copper production in Mexico decreased by 6.4% compared with that of 2012. This reduction in production was owing principally to a flood that affected the Buenavista del Cobre Mine, which was owned by a subsidiary of Grupo Mexico, and to a strike that affected production at the Maria Mine, which was owned by Minera Frisco S.A.B. de C.V. Of all the country's copper production, 76.9% took place in the State of Sonora; the remaining copper production came principally from the States of Zacatecas (10.5%), San Luis Potosi (5%), Chihuahua (3.5%), Guerrero (1.1%), and several other States, which produced copper in lesser amounts (Camara Minera de Mexico, 2014, p. 25).

Of the principal companies producing copper in Mexico, Grupo Mexico was the most significant, accounting for 70% of all copper production in Mexico. Other significant producers were, in order of volume of production, Peñoles, Capstone Mining, NEMISA, and Minera Frisco (Camara Minera de Mexico, 2014, p. 25; Grupo Mexico S.A.B. de C.V., 2014, p. 6).

The Chinese company Jinchuan Group controlled the Bahuerachi project in the State of Chihuahua. In 2012, the project was in the feasibility stage. The project's estimated resources were about 525 million metric tons (Mt) of ore with grades of 0.4% copper and 0.55% zinc. The estimated required investment for the project was $900 million. Grupo Mexico stated in 2012 that it would invest $1 billion in the Buenavista Mine, which was owned by Buenavista del Cobre S.A. de C.V. (a fully owned subsidiary of Grupo Mexico) to incorporate a new concentrator at the plant. The concentrator was expected to be finished by 2015 and would have the capacity to produce 188,000 metric tons per year (t/yr) of copper (Camara Minera de Mexico, 2014, p. 25; Grupo Mexico S.A.B. de C.V., 2014, p. 6).

Gold.—In 2013, Mexico's gold mine production increased by 14.6% compared with that of 2012. This increase was owing to the increase in capacity of existing mines and the start of several new projects, such as the Porvenir Mine in the State of Aguascalientes; the Concheño Mine in the State of Chihuahua; and the Cierro Prieto, the Carmen, and the San Felix Mines in the State of Sonora (Camara Minera de Mexico, 2014, p. 20).

The State of Sonora continued to be the principal producer of gold in Mexico. The State produced 31.1% of the national mined gold output in 2013, which was an increase of 2.1% compared with 2012. Other important States that produced gold were Zacatecas, which produced 16.3% of the national mined gold output, followed by Chihuahua (17.2%), Durango (13.3%), and Guerrero (9.3%); several other States produced gold in lesser amounts (Camara Minera de Mexico, 2014, p. 9).

The principal companies producing mined gold in Mexico were GoldCorp Inc., of Canada, Fresnillo plc., Agnico Eagle Corp. of Canada, Newmont Mining Corp. of the United States, Alamos Gold Inc. of Canada, Minera Frisco S.A.B de C.V., and New Gold Inc. of Canada (Camara Minera de Mexico, 2013, p. 164).

Iron and Steel.—In 2013, Mexico increased its iron ore production (in gross weight) by 25.3% but owing to the diminishing iron content of the ore, it produced only slightly more than 8 Mt in actual iron content. Production came mostly from the States of Coahuila, Colima, and Michoacan (table 1; Camara Minera de Mexico, 2014, p. 181).

Lead.—In 2013, the output of lead mine production in Mexico increased by 6.4% and reached a new record level of production for the third year in a row. The principal States that produced lead in Mexico were, in order by volume of production, Zacatecas, Chihuahua, and Durango (table 1; Camara Minera de Mexico, 2014, p. 29; Secretaria de Economia, 2014, p. 371).

Molybdenum.—Mexico, which was the fifth-ranked producer of molybdenum in the world, increased its production of molybdenum by 10.5% to 12,562 t in 2013. Grupo Mexico, which was the only molybdenum producer in the country, obtained most of its output in 2013 from the La Caridad Mine and the Buenavista del Cobre Mine in the State of Sonora. Mercator Minerals Ltd. of Canada declared that its El Creston project in Sonora was advancing. Mercator expected to begin production of molybdenum in 2016 with a potential output of 11,000 t/yr (table 1; Camara Minera de Mexico, 2014, p. 26; 2014, p. 30; Grupo Mexico S.A.B. de C.V., 2014 p. 6).

Silver.—Mexico's silver mine output in 2013 was 5,821 t, which was the highest annual level of silver production ever registered in Mexico, and it represented an increase in production of 8.6% compared with that of 2012. Mexico was again the leading silver producer in the world in 2013, accounting for 21% of the world silver production (table 1; Katrivanos, 2014).

The principal companies producing silver in Mexico were Coeur d'Alene Mines Corp. of the United States; First Majestic Silver Corp. of Canada, Fresnillo, GoldCorp, Grupo Mexico, Minera Frisco, Pan American Silver Corp. of Canada, Peñoles, and Primero Mining Corp of Canada; and small companies produced small amounts of silver. Approximately 30% of Mexico's production was obtained through dore; the rest was found principally in concentrates of copper, lead, and zinc, for which the capacity for refining has not been sufficient for the quantity obtained. The Fresnillo, the Saucito, and the Peñasquito Mines produced concentrates of zinc that contained high percentages of silver (Camara Minera de Mexico, 2013, p. 169).

In 2012 (the latest year for which data were available), the State of Zacatecas produced 43.5% of all the silver produced in Mexico. In 2012, the Fresnillo Mine which is located in Zacatecas, remained the leading silver mine in the world, producing 820.5 t in 2012; the mine accounted for 15.3% of all the silver produced in the country (Camara Minera de Mexico, 2013, p. 19, 168).

Zinc.—Production of zinc metal in Mexico decreased slightly in 2013 compared with that of 2012, and the level of zinc mine output decreased by 2.7% (table 1). Peñoles was the principal producer of zinc in Mexico. The company produced zinc from its five units—Bismark, Francisco I. Madero, Naica, Sabinas, and Tizapa (Camara Minera de Mexico, 2013, p. 23; Secretaria de Economia, 2014, p. 400).

Industrial Minerals

Fluorspar was the most valuable of Mexico's nonmetallic mineral commodities in 2013, accounting for 20.9% of the value of nonmetallic minerals produced. Salt was the second most valuable nonmetallic mineral at 15.9%; followed by phosphate rock, 10.6%; sodium sulfate, 10.2%; silica sand, 10.1%; sulfur, 9%; gypsum, 3.7%; and diatomite, 2.1% (table 1; Camara Minera de Mexico, 2014, p. 40).

Gypsum.—Gypsum production increased in Mexico by 8.4% in 2013. The principal producer of gypsum in Mexico was Compañia Occidental Mexicana S.A. de C.V., which had reserves of 16.6 Mt in 2012. More than 55% of the national production of gypsum took place in the municipality of Mulege, which is located in the State of Baja California Sur (tables 1, 2).

Phosphate Rock.—In 2013, the phosphate rock mine owned and operated by Roca Fosforica de Mexico S.A. de C.V. (Rofomex), which was a subsidiary of Grupo Fertinal S.A. de C.V., produced 2.2 Mt of concentrate compared with 1.7 Mt in 2012. This increase was owing to the modernization of the equipment in the mine. The Rofomex Mine is located in San Juan de la Costa in the State of Baja California Sur (table 1; Camara Minera de Mexico, 2013, p. 197; Secretaria de Economia, 2014, p. 501).

Mineral Fuels

Crude Petroleum and Natural Gas.—Mexico's crude oil production consists of 54% heavy crude oil, 33% light crude oil, and 13% extra light crude oil. In 2012 (the latest year for which data were available), PEMEX reported that it had produced an average of 2,548,000 barrels per day (bbl/d). This production originated in the company's 449 fields, which are located on 12 properties. Seventy-four percent of production came from, in order of volume produced, the Ku-Maloob-Zaap, the Cantarell, the Litoral Tabasco, and the Abkatun-Pol Chuc properties, which are located in the marine region of the Gulf of Mexico (Petróleos Mexicanos S.A. de C.V., 2013 p. 8–11).

In 2012, production at Cantarell decreased by 0.17% whereas production in the Kab, the Sihil, and the Yaxche oilfields increased significantly. The average production of these three fields combined was 139,000 bbl/d in January 2012 and, by yearend, production had increased to 218,000 bbl/d. PEMEX also reported that the combined output from the Kuil and the Tsimin fields (which began producing in August 2012) and the Pareto field (which had begun producing in March 2011) amounted by year's end to 43,000 bbl/d. According to PEMEX, these results were in line with its strategy to manage the decreased oil production that had been taking place in Mexico during the past few years (Petróleos Mexicanos S.A. de C.V., 2013 p. 8–11).

As a result of its exploration activities in the deep waters of the Gulf of Mexico, PEMEX made several discoveries that confirmed the occurrence of light crude oil in the Perdido Fold Belt. The Trion-1 well, which is located 28 kilometers (km) south of the border with the United States and 177 km from the State of Tamaulipas, and the Supremu-1 well, which is located 39 km from the U.S. border and 250 km from the coast of Tamaulipas, was drilled at a depth of 2,900 meters (m) below the surface, making it the deepest well ever drilled by PEMEX and the eighth deepest in the world. In 2013, the well had reached a depth of 4.5 km below sea level (Petróleos Mexicanos S.A. de C.V., 2013, p. 8–11).

Outlook

In 2013, mineral production in Mexico had mixed results as a whole, and production of metals will likely continue to be the most dynamic and profitable part of the mineral industry. Gold and silver exploration is continuing, with several new projects slated to commence production within 3 to 5 years, and many other mines are slated to reach their productive stages in 2014. The base-metals sector will likely profit from the development of these mines, as the majority of the mines are polymetallic projects.

In the area of industrial minerals, production still tends to be correlated with international prices and internal consumption. The Mexican Government expects the country's economy to continue to grow in the coming years, although at a slower pace, and this would benefit the construction sector and the promotion of internal consumption. Steps by PEMEX to manage its declining crude oil production will continue, and PEMEX has stated that it foresees the replacement rate of future reserves to remain above 100% in the foreseeable future (Petróleos Mexicanos, 2013 p. 10).

The Mexican Government estimates that growth in the coming years will be closely tied to that of the United States, as the United States is Mexico's principal trading partner (U.S. Central Intelligence Agency, 2014).

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TABLE 1
MEXICO: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
METALS						
Antimony[3]		74	71	100 [r]	169 [r]	294
Bauxite		20,000	21,250	14,400	96,000	--
Bismuth:						
Mine output, Bi content[4]		854	982	935	800	824
Metal, refined		854	952	935	800	824
Cadmium:						
Mine output, Cd content		1,510	1,464	1,485	1,482	1,451
Metal, refined		1,510	1,464	1,485	1,482	1,451
Copper:						
Mine output, Cu content:						
By concentration or cementation		170,597	168,855	336,739	367,852	344,140
Leaching, electrowon		57,151	68,754	65,691	71,679	65,032
Total		227,748	237,609	402,430	439,531	409,172
Metal:						
Anode and blister, primary		169,000	124,000	239,000	261,000	260,000 [e]
Refined:						
Primary		255,700	242,200	395,000	365,000	365,000
Secondary[e]		5,000	5,000	5,000	5,000	5,000
Total		260,700	247,200	400,000	370,000	370,000
Gold:						
Mine output, Au content	kilograms	51,393	72,596	88,648	102,802	117,848
Metal, refined	do.	19,410	29,000	32,729	38,926	35,985
Iron and steel:						
Iron ore, mine output:[5]						
Gross weight	thousand metric tons	11,677	13,998	12,806	14,915	18,840
Fe content	do.	7,073	7,931	7,763	8,047	8,094
Metal:						
Pig iron	do.	3,925	4,707	4,620	4,612	4,911
Direct-reduced iron	do.	4,147	5,368	5,854	5,587	6,100
Total	do.	8,072	10,075	10,474	10,199	11,011
Ferroalloys, electric arc furnace:[6]						
Ferromanganese	do.	42	81	74	70	75 [e]
Silicomanganese	do.	85	134	139	130	140 [e]
Total	do.	127	215	213	200	215 [e]
Crude steel	do.	13,957	16,710	18,101	18,095	18,208
Rolled products[7]	do.	12,994	14,491	15,482	15,927	15,950 [e]
Lead:						
Mine output, Pb content		143,838	192,062	223,717	238,091	253,361
Metal:						
Smelter:						
Primary[8]		85,411	110,980	101,729	112,431	107,262
Secondary[e]		110,000	110,000	110,000	110,000	110,000
Total[e]		195,411	220,980	211,729 [r]	222,431 [r]	217,262
Refined:						
Primary[9]		85,411	110,980	80,473	97,951	92,067
Secondary[e]		110,000	110,000	110,000	150,000	150,000
Total[e]		195,411	220,980	190,473 [r]	247,951 [r]	242,067
Manganese ore:[10]						
Gross weight[e]		329,400	485,447	474,820	523,000	587,000
Mn content		118,577	174,761	170,935	188,294	211,559
Mercury, mine output, Hg content[e]		15	15	--	--	--
Molybdenum, mine output, Mo content		10,166	10,849	10,787	11,366	12,562

See footnotes at end of table.

TABLE 1—Continued
MEXICO: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
METALS—Continued						
Silver:						
Mine output, Ag content	kilograms	3,553,841	4,410,749	4,777,710	5,358,195	5,821,001
Metallurgical products, Ag content:						
In copper bars	do.	104,922	--	--	--	--
Mixed gold and silver bars	do.	353,930	572,901	817,981	923,056	1,322,059
Metal, refined, primary	do.	1,845,029	2,230,024	2,336,141	2,329,963	2,318,718
Tin: metal, smelter, primary		--	--	--	--	--
Zinc:						
Mine output, Zn content		489,766	570,004	631,859	660,349	642,542
Metal, refined, primary		313,044	322,508	202,846	202,773	201,402
INDUSTRIAL MINERALS						
Barite		152,790	143,225	134,727	139,997	200,000 [e]
Cement, hydraulic[11]	thousand metric tons	35,160	34,503	35,400	36,184	34,612
Clays:						
Bentonite		511,429	590,998	563,795	956,224	617,632
Common		10,036,832	9,111,988	7,721,040	7,700,000 [e]	7,948,840
Fuller's earth		108,139	170,350	107,436	227,496	301,462
Kaolin		78,086	120,094	120,003	163,148	379,110
Diatomite		80,807	91,710	84,231	84,537	87,463
Feldspar		347,510	398,849	382,497	380,441	164,484
Fluorspar:						
Acid-grade	thousand metric tons	641	719	731	749	510
Metallurgical-grade	do.	405	348	475	487	700
Total	do.	1,046	1,067	1,206	1,236	1,210
Graphite, natural, amorphous		5,105	6,628	7,348	7,520	7,024
Gypsum and anhydrite, crude (yeso)		5,756,936	3,559,579	3,560,000 [e]	4,692,510	5,090,863
Magnesium compounds:						
Magnesia[12]		72,600	84,200	85,700	88,400	88,000 [e]
Magnesite		34,700	39,400	45,598	44,700	44,000 [e]
Mica, all grades		5,000	160	--	160	160 [e]
Nitrogen, N content of ammonia		861,034	824,373	765,500	879,700	879,000 [e]
Perlite		51,395	31,779	31,779	29,950 [r]	27,200
Phosphate rock[13]		426,547	452,220	507,181	517,398	665,244
Salt, all types	thousand metric tons	7,445	8,430	8,812	8,730	9,461
Sodium compounds:[e]						
Carbonate, soda ash, synthetic		290,000	290,000	290,000	290,000	290,000
Sulfate, natural, bloedite[14]		646,000	620,000	630,500	638,000	641,500
Stone, sand and gravel:						
Calcite, common		2,555,544	3,185,369	2,366,160	4,694,156	5,179,277
Dolomite		982,650	1,499,744	2,785,314	2,111,114	8,756,485
Limestone	thousand metric tons	62,000	64,678	54,344	55,725	52,289
Marble		2,800,512	2,495,649	4,431,447	3,820,517	3,563,699
Quartz, quartzite, glass sand (silica)		2,483,605	2,607,650	2,542,143	3,592,813	2,937,949
Sand	thousand metric tons	89,172	89,036	86,324	92,374	90,723
Gravel	do.	78,777	76,789	68,965	71,870	65,874
Strontium minerals, celestite		36,127	31,429	40,669	46,192	67,778
Sulfur, elemental, byproduct:						
Of metallurgy[e]	thousand metric tons	700	800	800	800	810 [e]
Of petroleum and natural gas	do.	1,114	992	959	1,010	1,026
Total[e]	do.	1,814	1,792	1,759	1,810	1,836
Talc		33,421	870	51,221	51,000 [e, 15]	50,000 [e, 15]
Vermiculite		291	98	--	500 [r]	425
Wollastonite		29,728	46,548	47,523	55,204	57,302

See footnotes at end of table.

TABLE 1—Continued

MEXICO: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Run of mine:						
Metallurgical	thousand metric tons	13,555	16,318	20,967	16,276	15,718
Steam	do.	9,496	11,247	13,718	13,656	13,065
Total	do.	23,051	27,565	34,685	29,932	28,783
Washed metallurgical coal	do.	2,000 [e]	4,767	5,061	4,903	4,613
Coke:[16]						
Metallurgical	do.	1,240	1,553	2,016	2,047	2,098
Breeze	do.	75	95	105	118	120 [e]
Total	do.	1,315	1,648	2,121	2,165	2,218
Gas, natural:						
Gross	million cubic meters	72,660	72,615	68,153	59,470	59,000 [e]
Marketable (dry)	do.	32,237	33,632	34,986	47,690 [r]	47,600 [e]
Petroleum:						
Crude	thousand 42-gallon barrels	949,365	940,240	930,750	930,020	935,079
Condensate, natural gas liquids	do.	135,050	137,605	140,160	148,190	148,100 [e]
Total	do.	1,084,415	1,077,845	1,070,910	1,078,210	1,083,179 [e]
Refinery products:						
Liquefied petroleum gas	do.	9,891	9,308	7,811	9,162 [r]	9,100 [e]
Motor gasoline	do.	172,097	154,833	146,110	147,606 [r]	147,000 [e]
Jet fuel	do.	20,841	18,944	20,550	20,367 [r]	20,300 [e]
Distillate fuel oil, diesel	do.	123,005	105,668	99,937	138,882 [r]	138,000 [e]
Lubricants	do.	1,533	1,570	1,351	1,300	1,300 [e]
Residual fuel oil	do.	115,413	117,530	112,238	99,974 [r]	99,900 [e]
Asphalt	do.	11,643	9,089	9,527	9,500	9,500 [e]
Other, refinery fuel and losses	do.	36,900	11,571	13,834	13,800	13,800 [e]
Total	do.	491,323	428,513	411,358	440,591 [r]	438,900 [e]

[e] Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r] Revised. do. Ditto. -- Zero.

[1] Table includes data available through February 27, 2015.

[2] In addition to the commodities listed, secondary aluminum and additional types of crude construction materials are produced, but output is not reported, and available information is inadequate to make reliable estimates of output.

[3] Sb content of antimonial lead.

[4] Refined metal. Bismuth content of impure smelter products no longer reported.

[5] Iron ore pellets.

[6] Reported by Cámara Nacional del Hierro y del Acero.

[7] Includes flat, nonflat, and seamless pipe steel products.

[8] Lead content of impure bar, antimonial lead, and refined metal.

[9] Includes lead content of antimonial lead.

[10] Mostly oxide nodules; includes smaller quantities of direct-shipping carbonates and oxide ores for metallurgical and battery applications.

[11] Includes gray and white portland and masonry cement.

[12] Reported by Industrias Peñoles, S.A. de C.V. as the only major producer. Includes caustic, electromelt, hydroxide, and refractory.

[13] Includes only output used to manufacture fertilizers.

[14] Series reflects output reported by the Secretaría de Economía.

[15] The Secretaría de Economía reported total production of 463,214 metric tons (t) in 2012 and 846,813 t in 2013, but these figures have not been verified.

[16] Includes coke made from imported metallurgical coal.

TABLE 2
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity
Antimony		Cía. Minera y Refinadora Mexicana, S.A. (private Mexican, 51%, and Cookson Ltd., 49%)	San Jose Mine, Catorce, S.L.P.	365.
Barite		Barita de Sonora, S.A. [Grupo Acerero del Norte, S.A. de C.V., 100%]	Mazatan, Son.	219.
Do.		Minerales y Arcillas, S.A. de C.V. (private Mexican, 100%)	San Francisco del Huerto Mine in San Pedro, Coah., La Escondida and Angelita Mines and plant in Galeana	55.
Do.		Barita de Santa Rosa, S.A. de C.V. (private Mexican, 100%)	Muzquiz, Coah.	256.
Bismuth	metric tons	Metalurgica Met-Mex Peñoles, S.A.B. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Torreon, Coah.	1,200.
Cement		CEMEX México (Cementos Mexicanos, S.A.B. de C.V., CEMEX 100%)	Ensenada, B.C.N.; Torreon, Coah.; Barrientos, D.F.; Arotonilco and Huichapan, Hgo.; Guadalajara and Zapotilic, Jal.; Hidalgo and Monterrey, N.L.; Tepeaca, Pue.; Tamuin and Valles, S.L.P; Hermosillo and Yaqui, Son.; and Merida,Yuc.	26,650.
Do.		Cementos Apasco, S.A. de C.V. (Holcim Group, 49%, and other, 51%)	Apasco, Mex.; Ramos Arizpe, Coah.; Macuspana, Tab.; Tecoman, Col.; Orizaba, Ver.; and Acapulco, Gro.	8,900.
Do.		Cooperativa La Cruz Azul, S.C.L. (private Mexican, 100%)	Cruz Azul, Hgo., Lagunas, Oax.	5,000.
Do.		Cementos de Chihuahua, S.A. de C.V. (CEMEX México, 36%, and private Mexican, 64%)	Chihuahua, Cuidad Juarez, and Samalayuca, Chih.	2,000.
Do.		Lafarge México (Lafarge Group, 100%)	Vito, Hgo.	600.
Do.		Corporación Moctezuma, S.A. (Cementos Molins, S.A., 50%, and Buzzi Unicem SpA, 50%)	Tepetzingo, Mor.	2,400.
Do.		Corporación Moctezuma, S.A. (Cementos Molins, S.A., 50%, and Buzzi Unicem SpA, 50%)	Cerritos, S.L.P.	2,400.
Coal		Minera Monclova, S.A. [Altos Hornos de México, S.A. de C.V. (AHMSA), 100%]	Mimosa and Palau Mines and Muzquiz washing plant at Palau, Coah., and coking plant at Monclova, Coah.	3,000.
Do.		Carbonífera de San Patricio, S.A. de C.V. (private Mexican, 100%)	Progreso, Coah.	1,314.
Do.		Industrial Minera México, S.A. de C.V. (IMMSA) (Grupo México, S.A.B. de C.V., 90%)	Nueva Rosita, Coah.	1,500.
Do.		Minera Carbonífera Río Escondido, S.A. [Altos Hornos de México (AHMSA), 100%]	Mina I, Mina II, and Tajo I at Nava and Piedras Negras, Coah.	6,500.
Copper		Mexicana de Cobre, S.A. de C.V. (Grupo México, S.A.B. de C.V., 90%)	La Caridad Mine, smelter, refinery, SX-EW[2] plant, and rod plant at Nacozari de Garcia, Son.	350 smelter, 50 SX-EW,[2] 300 refinery, 150 rod plant.
Do.		Buenavista del Cobre, S.A. de C.V. (Grupo México, S.A.B. de C.V., 90%)	Buenavista del Cobre Mine and SX-EW[2] plant at Cananea, Son.	29,200 mill, 33 SX-EW.[2]
Do.		Minera María S.A. de C.V. (Minera Frisco S.A.B de C.V, 100%)	Mine and SX-EW[2] plant at Cananea, Son.	20 SX-EW.[2]
Do.		Cobre de México, S.A. de C.V. (Grupo Condumex)	Primary refinery in Mexico City and secondary refinery in Villagran, Gto.	150.
Ferroalloys		Cía. Minera Autlán, S.A.B de C.V. (Grupo Ferrominero, S.A. de C.V., 54%; Minas de Basis, S.A. de C.V., 32%; BHP Billiton Ltd., 14%)	Plant in Tamos, Ver.	140.
Do.		do.	Plant in Teziutlan, Pue.	38.
Do.		do.	Plant in Gomez Palacio, Dgo.	35.

See footnotes at end of table.

TABLE 2—Continued
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity
Fluorspar		Cía. Minera Las Cuevas, S.A. de C.V. (Mexichem, S.A. de C.V.)	Salitera (Zaragoza), S.L.P.	520.
Do.		Fluorita de México, S.A. de C.V. (Mexichem S.A. de C.V.)	Mines at La Encantada district and plant at Muzquiz, Coah.	150.
Gold, mine	kilograms	Fresnillo plc. (Industrias Peñoles S.A.B de C.V., 77.1%)	Proaño (Fresnillo) Mine, Zac.	1,200.
Do.	do.	Goldcorp Inc., 100%	Peñasquito Mine, Zac.	17,700.
Do.	do.	Minas de las Altas Pimerias, S.A. de C.V. (Goldcorp Inc., 100%)	El Sauzal Mine, Chih.	10,000.
Do.	do.	Fresnillo plc., 56%	La Herradura Mine, Son.	6,900.
Do.	do.	Goldcorp Inc., 100%	Los Filos, Gro.	8,100.
Do.	do.	Primero Mining Corp. 100%	San Dimas, Dgo	4,850
Do.	do.	Minera Frisco S.A.B. de C.V.	Ocampo Mine, Chih.	1,590.
Do.	do.	Minera Mexicana La Ciénega, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	La Cienega Mine, Dgo.	4,500.
Do.	do.	Animas Resources Ltd. (Animas Resources Ltd., 100%)	Santa Gertrudis Mine, Son.	1,600.
Do.	do.	Cía. Minera El Cubo, S.A. de C.V. (Endeavour Silver Corp., 100%)	El Cubo Mine, Gto.	1,200.
Do.	do.	Pediment Gold Corp. (Argonaut Gold Inc., 100%)	La Colorada Mine, Son.	800.
Do.	do.	Alamos Gold Inc., 100%	Mulatos Mine, Son.	4,700.
Do.	do.	Great Panther Silver Ltd., 100%	Guanajuato Mine, Gto.	438.
Gold, refined	do.	Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Torreon, Coah.	36,700.
Graphite		Grafitos Mexicanos, S.A. (Cummings Moore Graphite Co., 25%, and private Mexican, 75%)	Lourdes and San Francisco Mines, Son.	60.
Do.		Grafito Superior, S.A. de C.V. (Superior Graphite Co., 100%)	Covalmar, Santa Clara, and Rio Mayo Mines, and plant in Son.	25.
Gypsum		Cía. Occidental Mexicana, S.A. de C.V. (private Mexican, 51%, and Domtar, Ltd., 49%)	Santa Rosalia on San Marcos Island, B.C.S.	2,500.
Iron ore		Peña Colorada Ltd. de C.V. (ArcelorMittal Holdings AG, 50%, and Ternium S.A., 50%)	Peña Colorada Mine and pellet plant near Manzanillo, Col.	4,200.
Do.		Altos Hornos de Mexico, S.A. de C.V. (AHMSA) [Grupo Acerero del Norte, S.A. de C.V. (GAN), 78.9%]	La Perla Mine, Chih.; Hercules Mine, Coah.; and Cerro de Mercado Mine, Dgo.	5,000.
Do.		ArcelorMittal Las Truchas S.A. de C.V. (ArcelorMittal Holdings AG, 100%)	Ferrotepec, Volcan, and Mango deposits in Las Truchas project area and pellet plant, Mich.	2,350.
Do.		Hylsa, S.A. de C.V. (Ternium S.A, 88.72%)	Aquila Mine, Mich.	1,900
Lead and zinc		Industrial Minera México, S.A. de C.V. (IMMSA) (Grupo México, S.A.B. de C.V., 90%)	Charcas, S.L.P.; San Martin, Zac.; Santa Eulalia, Chih.; Taxco, Gro.; Rosario, Sin.; Santa Barbara, Chih.; Velardena, Dgo; lead refinery at Monterrey, N.L.; and zinc refinery at S.L.P.	70 lead, mine, 110 refined zinc.
Do.		Industrias Peñoles S.A.B. de C.V. (private Mexican, 100%)	Mines at La Encantada, Coah.; Fresnillo, Zac.; Naica, Chih.; Bismark, Son; Rey de Plata, Gro. (Industrias Peñoles S.A.de C.V., 51%, and Dowa Mining Co., 39%). Metallurgical complex at Torreon, Coah., with silver, lead, and zinc smelter and refineries operated by Met-Mex Peñoles (Industrias Peñoles S.A. de C.V., 100%)	180 refined lead, 240 refined zinc.
Do.		Industrias Peñoles, S.A.B de C.V.	Francisco I. Madero Mine, Zac.	50,000 zinc.
Do.		Minera San Francisco del Oro, S.A. de C.V. (Minera Frisco, S.A.B. de C.V., 100%)	San Francisco del Oro, near Hidalgo del Parral, Chih. Tayahua, Zac.	15 lead, 21 zinc.

See footnotes at end of table.

TABLE 2—Continued
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity
Manganese		Cía. Minera Autlán, S.A.B. de C.V. (Grupo Ferrominero, S.A. de C.V., 81.75%, and private Mexican, 18.25%)	Molango, Naopa, and Nonoalco Mines, Hgo.	600 ore and concentrate.
Molybdenum		Mexicana de Cobre, S.A. (Grupo México, S.A.B. de C.V., more than 90%)	La Caridad Mine and molybdenum plant, Son.	11.
Petroleum[3]	thousand barrels per day	Petróleos Mexicanos, S.A. de C.V. (PEMEX) (Government, 100%)	Comalcalco, Poza Rica, Ver., and Gulf of Campeche, Cam., Districts	3,500.
Phosphate Rock		Roca Fosforica de Mexico S.A. de C.V. (Grupo Fertinal S.A. de C.V., 100%.)	San Juan de la Costa Mine, B.C.S.	NA
Salt		Exportadora de Sal, S.A. (Fideicomiso de Fomento 51%, and Mitsubishi Corp., 49%)	Solar salt complex at Guerrero Negro, B.C.S.	6,000.
Silver	kilograms	Fresnillo Plc. (Industrias Peñoles S.A.B de C.V., 75%)	Proaño (Fresnillo) Mine, Zac.	1,100,000.
Do.	do.	do.	El Saucito Mine, Zac	480,000.
Do.	do.	Minera Mexicana La Ciénega, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	La Cienega Mine, Dgo.	65,800.
Do.	do.	Minera Bismark, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	Bismark Mine, Chih.	7,000.
Do.	do.	Co. Minera Sabinas, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	Sabinas Mine, Zac.	157,000.
Do.	do.	Minera Tizapa, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 51%; Dowa Holdings Ltd., 39%; Sumitomo Corp., 10%)	Tizapa Mine, Mex.	140,000.
Do.	do.	Minas Peñoles S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Francisco I. Madero Mine, Zac.	63,000.
Do.	do.	Industrial Minera México, S.A. de C.V. (IMMSA) (Grupo México, S.A.B. de C.V., 90%)	San Martin Mine, Sombrerete, Zac.; Taxco, Gro.; Charcas, S.L.P.; Santa Eulalia, Chih.; and refinery at Monterrey, N.L.	335,000.
Do.	do.	Pan American Silver Corp.	La Colorada Mine, Zac. and Alamo Dorado, Son.	200,000.
Do.	do.	Metalurgica Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Torreon, Coah.	2,900,000 refinery.
Do.	do.	Mexicana de Cobre, S.A. de C.V. (Grupo México, S.A.B. de C.V., 100%)	La Caridad metallurgical complex, Son.	466,500.
Do.	do.	Coeur d'Alene Mines Corp, 100%	Palmarejo Mine, Chih.	250,000.
Do.	do.	First Majestic Silver Corp., 100%	La Encantada Mine, Coah.	140,000.
Do.	do.	Goldcorp Inc., 100%	Peñasquito Mine, Zac.	361,000.
Sodium sulfate		Química del Rey, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Plant at Laguna del Rey, Coah.	620.
Steel		Altos Hornos de Mexico, S.A. de C.V. (AHMSA) [Grupo Acerero del Norte, S.A. de C.V. (GAN), 78.9%]	Steelworks at Monclova, Coah.	3,316 steel, 3,800 pellet.
Do.		Hylsa S.A. de C.V. (Ternium S.A., 88.72%)	Steel works and direct-reduction units at Monterrey Monterrey, N.L., and Puebla, Pue.; pelletizing plant in Col.	3,100 steel, 1,500 pellet.
Do.		DEACERO, S.A. de C.V. (private Mexican, 100%)	Steelworks at Saltillo, Coah., and Celaya, Gto.	1,450.
Do.		ArcelorMittal Lazaro Cardenas S.A de C.V. (ArcelorMittal Holdings AG, 100%)	Facilities at Lazaro Cardenas, Mich.	5,300 steel, 4,000 pellet.
Do.		Tubos de Acero de México, S.A. (private Mexican, 100%)	Veracruz, Ver.	1,000.
Strontium (celestite)		Cía. Minera La Valenciana (private Mexican, 100%)	San Agustin Mine, Torreon, Coah.	50.
Sulfur		Petróleos Mexicanos, S.A. de C.V. (PEMEX)	Nationwide petroleum operations	890.

Do., do. Ditto. NA Not available.

[1] State abbreviations used in this table include the following: Baja California Norte (B.C.N.), Baja California Sur (B.C.S.), Campeche (Cam.), Chihuahua (Chih.), Coahuila (Coah.), Colima (Col.), Distrito Federal (D.F.), Durango (Dgo.), Guanajuato (Gto.), Guerrero (Gro.), Hidalgo (Hgo.), Jalisco (Jal.), Mexico (Mex.), Michoacan (Mich.), Morelos (Mor.), Nuevo Leon (N.L.), Oaxaca (Oax.), Puebla (Pue.), San Luis Potosi (S.L.P.), Sinaloa (Sin.), Sonora (Son.), Tabasco (Tab.), Veracruz (Ver.), Yucatan (Yuc.), and Zacatecas (Zac.).

[2] Solvent extraction-electrowinning.

[3] Petróleos Mexicanos, S.A. de C.V. operated six refineries with an installed capacity of 1.68 million barrels per day.

THE MINERAL INDUSTRIES OF PARAGUAY AND URUGUAY

By Yadira Soto-Viruet

PARAGUAY

Cement, crushed stone, gypsum, and iron and steel were the mineral commodities that were most significant to Paraguay's economy. In 2013, Paraguay's real gross domestic product (GDP) increased by 14% compared with that of 2012. The mining and quarrying sector made only a minor contribution (about 0.1%) to the country's GDP. The country continued to rely on crude oil and refinery products imports and consumed 27,190 barrels per day (bbl/d) of crude oil in 2013 (Banco Central del Paraguay, 2015b; U.S. Energy Information Administration, 2015).

According to the World Bank, production of energy was one of the most important economic activities in the country. Electricity and water accounted for about 1.6% of the country's GDP, and energy exports, for about 24% of the country's total exports in 2013. Paraguay's primary energy production was based mainly on hydroelectric and biomass sources. Paraguay operated three hydroelectric plants through the Government-owned Administración Nacional de Electricidad (ANDE)—the Acaray hydroelectric plant, the Itaipu Binacional plant (a joint project with Brazil), and the Yacyreta Binacional plant (a joint project with Argentina). ANDE was engaged in the generation, transmission, and distribution of electric power in the country. In 2013, Paraguay produced 60,381 gigawatthours (GWh) of electricity compared with 60,235 GWh in 2012 and consumed 9,018 GWh compared with 8,222 GWh in 2012. Of the total electricity generated in the country, 78% was exported. Brazil and Argentina received 84% and 16% of Paraguay's electricity exports, respectively (Ministerio de Obras Publicas y Comunicaciones, 2010, 2014, p. 1–2; World Bank Group, 2015).

Government Policies and Programs

The Dirección de Recursos Minerales (DRM), which is under the Ministerio de Obras Públicas y Comunicaciones (MOPC), is the Government entity responsible for the administration of the mineral sector. The mineral sector is regulated by mining law No. 31.180/2007, which was modified by law No. 4.269/11 in 2011 and by law No. 4.935/2013 in 2013, which states that mining rights can be assigned to those who meet the conditions required by the law, with prior authorization from the MOPC, and who enroll in the mining cadaster register (Republica del Paraguay, 2013, p. 1–2).

Production

Data on mineral commodities produced are in table 1.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Mineral Trade

The total value of Paraguay's exports in 2013 was about $9.4 billion compared with about $7.2 billion in 2012. The country's major export partners were, in decreasing order of value, Brazil (which received 30% of Paraguay's exports), Russia (10%), Argentina (8%), Chile (6%), and Germany (3.5%). Iron and steel exports were valued at about $28.0 million. In 2013, the total value of Paraguay's imports was about $11.3 billion compared with about $10.8 billion in 2012. The country's major import partners were, in decreasing order of value, China (which supplied 28% of Paraguay's imports), Brazil (27%), and Argentina (14%). Imports of fuels and lubricants were valued at about $1.6 billion and accounted for about 14% of total imports (Banco Central del Paraguay, 2014).

Paraguay continued to be a member of the Mercado Común del Cono Sur (MERCOSUR), which is a trade association in the Americas whose member countries were Argentina, Bolivia, Brazil, Uruguay, and Venezuela. In 2013, MERCOSUR countries accounted for about 40% of Paraguay's exports and about 42% of its imports (Banco Central del Paraguay, 2015a; Mercado Común del Cono Sur, 2015).

Commodity Review

Metals

Aluminum.—In December, Rio Tinto Alcan Inc. of Canada suspended its plans to construct a $4 billion aluminum smelter with the capacity to produce 674,000 metric tons per year (t/yr) of aluminum. The company attributed the suspension to world market conditions, including low aluminum prices. The smelter had been scheduled to start operations by 2016 (Thomson Reuters, 2013).

Gold.—Latin American Minerals Inc. (LAMI) of Canada held a 100% interest in the Paso Yobai gold project, which is located in the Department of Guaira about 160 kilometers (km) east of the capital city of Asuncion. In 2013, LAMI continued with its bulk-sampling operation at Paso Yobai's Independencia Mine, and the sample material was processed onsite at the company's concentrator plant. LAMI expected to receive an environmental permit for the development of a 24,000-t heap-leach gold-recovery facility at Independencia in 2014; the facility would process stockpiled mineralized material grading between 0.6 and 0.8 gram per metric ton (g/t) gold. The company also planned to continue exploration work at seven target areas within the Paso Yobai project in 2014 (Latin American Minerals Inc., 2014, p. 4–9).

Industrial Minerals

Cement.—Paraguay continued to rely on cement imports to satisfy domestic demand; in 2013, imports totaled 433,344 metric tons (t) compared with 413,879 t in 2012. At yearend, Yguazu Cementos S.A. (YCSA) began operations at the Villa Hayes cement plant, which was located in the Department of Presidente Hayes. The new plant had the capacity to produce about 400,000 t/yr of cement. The company planned initially to satisfy the country's cement demand and eventually to increase cement production to about 450,000 t/yr by 2015. YCSA was a joint venture among Concret-Mix S.A. and Brazilian companies Camargo Correa Group and Votorantim Cimentos S.A. (Yguazu Cementos S.A., 2011; ABC Color, 2013; America Economica, 2013; Grupo Nacion de Comunicaciones, 2013; Banco Central del Paraguay, 2014).

Diamond, Niobium (Columbium), and Rare Earths.—LAMI continued exploration work at the Itapoty diamond project, which was located about 150 km northeast of Asuncion. In 2013, the company sought joint-venture partners to advance the project. Itapoty included two 100%-owned exploration property claims, which totaled 155,800 hectares. Itapoty had been operated by Olivut Resources Ltd. of Canada since 2011 under an option agreement that gave Olivut the option to aquire 50% of the project by investing about $1 million in exploration during a 30-month period. In September 2013, LAMI renewed its option agreement with Olivut for all the concessions and claims at Itapoty. The company was also seeking joint-venture partners for its prospecting concession at the Chiriguelo niobium and rare-earths project, which is located 330 km northeast of Asuncion. Historically, pyroclore had been found in abundance at Chiriguelo (surface and historic drilling) and rare-earth oxides also had been found in abundant concentrations at the surface and in trenches (Latin American Minerals Inc., 2013, p. 16; 2014, p. 4–9).

Mineral Fuels and Related Materials

Natural Gas and Petroleum.—In 2013, at least three companies were engaged in the exploration of mineral fuels in Paraguay—Amerisur Resources plc and President Energy PLC of the United Kingdom and Crescent Group Corp. of the United States.

Uranium.—Uranium Energy Corp. of the United States held 100% interest in the Coronel Oviedo and Yuty uranium projects. These projects are located in southeastern Paraguay within the Parana basin, which hosts several uranium deposits in Brazil, such as the Amorinopolis and the Figueira deposits. The area is underlain by upper Permian-Carboniferous sedimentary rock. Both projects were being explored in 2013. As of 2011, measured and indicated mineral resources at Yuty were estimated to be 7.8 million metric tons (Mt) at an average grade of 0.05% triuranium octoxide (U_3O_8), and inferred mineral resources were estimated to be 2.1 Mt at an average grade of 0.05% U_3O_8. Preliminary studies at Yuty indicated that the ore would be amenable to extraction by in-situ recovery methods. The company expected to continue exploration work at Coronel Oviedo and Yuty in 2014 (U.S. Securities and Exchange Commission, 2014; Uranium Energy Corp., 2015).

Outlook

Paraguay forecasted GDP growth of 4.8% for 2014 (International Monetary Fund, 2014, p. 62). In the short term, the opening of the YCSA cement plant and the company's plans to increase capacity are likely to reduce Paraguay's cement imports. Exploration for mineral fuels is set to continue in 2014. In the longer term, if plans to develop the country's diamond, gold, niobium, rare-earth, and uranium deposits come to fruition, the mineral sector is likely to attract foreign direct investment.

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URUGUAY

Uruguay's mineral industry was dominated by the production of cement, crude steel, gold, industrial minerals, and petroleum refinery products. Industrial minerals produced in the country included clays, crushed stone, dolomite, granite, and limestone. The country also produced natural gemstones, such as agate and amethyst. In 2013, Uruguay's GDP increased by about 4.4% compared with that of 2012. Petroleum refinery products accounted for 0.8% of the total GDP, and mining accounted for about 0.3%. Uruguay relied completely on crude oil and natural gas imports; in 2013, Argentina supplied all the country's natural gas imports. In 2013, renewable energy sources accounted for about 84% of the country's energy source, and fossil fuels accounted for about 16% (Banco Central del Uruguay, 2014; Ministerio de Industria, Energía y Minería, 2014a, p. 3, 5–6).

Government Policies and Programs

The Ministerio de Industria, Energia y Mineria (MIEM) is the Government agency responsible for the administration of the energy, industry, mining, and telecommunications sectors. The Direccion Nacional de Mineria y Geologia, which is part of the MIEM, is the authority that regulates mining activities and issues mineral licenses. The mineral sector is regulated by the mining code (law No. 15.242 of January 8, 1982), which was modified by law No. 18.813 of September 23, 2011, and environmental law No. 17.283. The Administración Nacional de Combustibles, Alcohol y Portland (ANCAP) is a Government-owned holding company created by law No. 8764 of October 15, 1931, that is involved in the production of alcohol, petroleum derivatives, and portland cement, among other duties. A new large-scale mining law [law No. 19.126 (mineria de gran porte)] became effective on September 25, 2013. The new law establishes taxes and environmental standards for potential large-scale mining projects (Administración Nacional de Combustibles, Alcohol y Portland, 2014; Ministerio de Industria, Energía y Minería, 2014b–d).

Production

In 2013, bentonite production increased by 62% to 8,974 t from 5,530 t in 2012; gold, by 17% to 2,022 kilograms (kg) from 1,725 kg; crude steel, by 15% to 90,000 t from 78,000 t (revised); and natural gemstones (agate and amethyst), by 10% to 21,996 t from 19,970 t. Production of crushed stone decreased, by 35% to 1.9 Mt in 2013 from 3.0 Mt in 2012 and clays, by 27% to 19,555 t from 26,670 t (revised). Data on mineral production are in table 1.

Structure of the Mineral Industry

In Uruguay, cement was produced by Cementos Artigas S.A., which was a joint venture between Votorantim Cimentos of Brazil (51%) and Cementos Molins S.A. of Spain (49%), and by Cementos del Plata S.A., which was owned by ANCAP. These companies had a combined production capacity of about 1.0 million metric tons per year (Mt/yr). Table 2 is a list of major mineral industry facilities.

Mineral Trade

In 2013, the total value of Uruguay's exports was about $9.1 billion compared with $8.7 billion (revised) in 2012. The country's major export partners were, in decreasing order of value, Brazil (which received 19.1% of Uruguay's exports), China (16.0%), Argentina (5.2%), Venezuela (4.9%), Germany (4.0%), and the United States (3.9%). Gold (unwrought or in semimanufactured forms) accounted for about $93.2 million of these exports, and petroleum oils (excluding crude oil), about $25.5 million. The total value of Uruguay's imports was about $9.5 billion in 2013 compared with $8.5 billion (revised) in 2012. Crude petroleum oils accounted for $2.1 billion of these imports; petroleum oils (excluding crude oil), $690 million; anhydrite, gypsum, and plasters, $2.1 million; and kaolin and other kaolinic clays, $1.1 million. Uruguay's major import partners were, in decreasing order of value, China (which supplied 20.2% of Uruguay's imports), Brazil (17.4%), Argentina (17.0%), and the United States (9.0%) (Uruguay XXI, 2014a; 2014c, p. 7–8).

Uruguay's exports to the United States were valued at about $423 million in 2013 compared with about $357 million in 2012; these exports included nearly $17 million in petroleum products. Imports from the United States were valued at about $1.7 billion in 2013 compared with about $1.3 billion in 2012. Fuel oil accounted for about $158 million of these imports; excavating machinery, about $29 million; and drilling and oilfield equipment, about $844,000 (U.S. Census Bureau, 2014a, b).

Commodity Review

Metals

Gold.—Orosur Mining Inc. (OMI) of Canada was Uruguay's only producer of gold; it operated the San Gregorio project, which included the Arenal open pit and underground mine, and the San Gregorio and Santa Teresa open pit mines. The San Gregorio project is located in the Department of Rivera, 450 km north of the capital city of Montevideo. During fiscal year 2013 (ending on May 31, 2013), the project produced 2,022 kg of gold compared with 1,725 kg in 2012. The company attributed the increase in production to the ongoing development and ramp up of the Arenal underground mine, which is located about 2 km east of the San Gregorio mill and plant. As of May 31, measured and indicated mineral resources at San Gregorio were estimated to be about 4.7 Mt at an average grade of 1.30 g/t gold at a cutoff grade of 0.5 g/t, and inferred resources were estimated to be 966,000 t at an average grade of 1.10 g/t gold. Probable reserves at San Gregorio were estimated to be 830,000 t at an average grade of 1.95 g/t gold at a cutoff grade of 0.6 g/t. The San Gregorio processing plant had a capacity of about 1.2 Mt/yr; the Arenal underground mine accounted for about 33% of the total gold production. In December, an exploration permit was granted by the Government for the Vaca Muerta project, which is located 52 km east-southeast of the town of Minas de Corrales. Measured and indicated mineral resources at Vaca Muerta were estimated to be 470,000 t at an average grade of 1.47 g/t gold at a cutoff grade of 0.7 g/t, and inferred mineral resources were estimated to be 54,000 t at an average grade of 1.34 g/t. The company planned to continue exploration work to delineate new resources and reserves at San Gregorio's Arenal and Vaca Muerta properties and expected to produce between 1,600 and 1,700 kg of gold in 2014 (Orosur Mining Inc., 2013, p. 12–15, 18–19; 2014).

Iron Ore.—In 2013, Gladiator Resources Ltd. of Australia completed a prefeasibility study at the Zapucay iron ore project, which is located about 450 km north of Montevideo and covers an area of about 750 square kilometers. The project included the Buena Orden, Iman, and Papagayo deposits. Total inferred and indicated resources at the three deposits were estimated to be 69.4 Mt at an average grade of 26.5% iron at a cutoff grade of 15% iron. The project included an open pit mine, a concentrator, a pellet plant, and a mini blast furnace and had the potential to produce about 570,000 t of iron pellets and 420,000 t of merchant pig iron over a period of at least 19 years. The company envisioned that the iron ore would be mined and processed to a magnetite concentrate, which would be pelletized to make it suitable as a blast furnace feed. In 2010, Gladiator Resources entered into a joint-venture agreement with OMI; according to the agreement, Gladiator could earn up to an 80% interest in the iron ore, manganese ore, and base-metal projects in OMI's project area at the Isla Cristalina Belt by completing a bankable feasibility study by December 2015 (Gladiator Resources Ltd., 2012, p. 5–6, 12; 2013, p. 1–2, 6).

The Valentines iron ore project was owned by Zamin Ferrous Ltd. of the United Kingdom through its subsidiary Mineria Aratiri. In December, the Government declared the Valentines a megamining project, based on the new large-scale mining law. The project, which covers a total area of about 14,500 hectares, has the potential to develop five open pit mines (Las Palmas, Maidana, Morochos, Mulero, and Uria), a beneficiation plant, and a 212-km slurry pipeline to transport the iron ore to a terminal to be built on the coast. The project would have the potential to produce about 18 Mt/yr of iron concentrate during a mine life of 20 years. As of 2013, the environmental impact assessment for the Valentines project had not been approved by the Government (Mineria Aratiri, 2011, p. 3; Presidencia de la Republica Oriental del Uruguay, 2013a).

Mineral Fuels

Natural Gas.—The Gasoducto del Litoral (also known as the CR. Federico Slinger) and the Gasoducto Cruz del Sur (GCDS) pipelines supplied Uruguay with natural gas from Argentina. The Gasoducto del Litoral was operated by ANCAP and ran about 30 km from Colon, Argentina, to Paysandu, Uruguay. The GCDS was operated by a consortium consisting of ANCAP, British Gas Group, Pan American Energy, and Wintershall Holding GmbH of Germany and extended about 250 km from Punta Lara, Argentina, to Montevideo, Uruguay. In 2013, the country imported about 59 million cubic meters of natural gas. In October, Gas Sayago S.A., which was owned by the ANCAP and the Government-owned Administracion Nacional de Usinas y Transmisiones Electricas, signed a 15-year contract with GDF SUEZ S.A. of France for development and operation of the new liquefied natural gas (LNG) import terminal at a cost of about $1.1 billion. The offshore terminal, which would be located about 2.5 km from the shoreline at Punta Sayago, would include a floating storage and regasification unit and a jetty protected by a 1.5-km breakwater. The terminal would have a storage capacity of about 263,000 cubic meters and a regasification capacity of about 10 million cubic meters per day of natural gas. The import terminal was expected to increase Uruguay's energy supply, reduce imports of oil, and allow the country to export natural gas to Argentina through the GCDS pipeline. The terminal, which was part of the GNL del Plata project, was expected to be completed by 2015 (GDF SUEZ S.A., 2013; Thomson Reuters, 2013; Gas Sayago S.A., 2014; Ministerio de Industria, Energía y Minería, 2014a, p. 5).

Petroleum.—In 2013, the country imported about 13.8 million barrels (Mbbl) of crude oil compared with 14.4 Mbbl in 2012. In October, the Brazilian state-owned Petroleo Brasileiro S.A. (Petrobras) announced the sale of its 40% interest in exploration Blocks 3 and 4 to Royal Dutch Shell plc of the United Kingdom, subject to the approval of the ANCAP. Yacimientos Petroliferos Fiscales (YPF) of Argentina held 40% interest in the two exploration blocks, and Galp Energia Group of Portugal held 20%. Blocks 3 and 4 are located in the Punta del Este Basin. The Government also planned to offer additional hydrocarbon exploration blocks in its Uruguay round II tender by 2015 (El PAIS S.A., 2013b; Petroleo Brasileiro S.A., 2013; Ronda Uruguay III, 2014; U.S. Energy Information Administration, 2014).

In 2013, at least eight companies were engaged in exploration for hydrocarbons in the country. They included YPF (Argentina); Total S.A. (France); INPEX Corp. (Japan); Galp Energia (Portugal); and BG Group plc, BP p.l.c., Royal Dutch Shell plc, and Tullow Oil plc (United Kingdom) (Uruguay XXI, 2014b).

La Teja refinery (owned by ANCAP) was Uruguay's sole petroleum refiner. In August, ANCAP inaugurated a new desulfurization plant located within the La Teja refinery, at an investment cost of about $350 million. The new plant, which was named the Eduardo Acevedo, would reduce the sulfur in gas oil by 99.5% and in naphtha by 85%. The new plant had the capacity to produce about 18,000 bbl/d of gas oil and about 5,000 bbl/d of naphtha and could recover about 34 metric tons per day of sulfur. The refinery expansion program was a joint venture between ANCAP and YPF, through its subsidiary Astra Evangelista S.A. (EL PAIS S.A., 2013a; Presidencia de la Republica Oriental del Uruguay, 2013b; Astra Evangelista S.A., 2014; Ministerio de Industria, Energía y Minería, 2014a, p. 3, 20).

Outlook

Uruguay's GDP was forecasted to increase by 2.8% in 2014 (International Monetary Fund, 2014, p. 62). The new large-scale mining law suggests that the country is attempting to attract foreign investments for potential large-scale mining projects in the mineral sector and to increase interest in nonfuel mineral prospecting. Uruguay's future prosperity could also be enhanced by the development of identified mineral resources and potential offshore hydrocarbons.

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TABLE 1

PARAGUAY AND URUGUAY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Country and commodity		2009	2010	2011	2012	2013
PARAGUAY[2]						
Cement, hydraulic[e]	thousand metric tons	600	650 [3]	650 [3]	650	650
Gypsum[e]		4,500	4,400 [3]	4,500	4,500	4,500
Iron and steel:[4]						
Pig iron		71,000 [r]	81,000 [r]	42,000 [r]	67,000 [r]	65,000
Steel, crude		54,000 [r]	59,000	30,000	44,000	45,000
Stone, crushed and broken	thousand metric tons	13,500	13,500	14,795	14,800 [e]	14,800 [e]
URUGUAY[5, 6]						
Bentonite		210	430	1,210	5,530	8,974
Cement, hydraulic[7]	thousand metric tons	1,050 [r]	834 [r]	968 [r]	872 [r]	900 [e]
Clays, unspecified		68,090 [r]	43,330 [r]	31,350 [r]	26,670 [r]	19,555
Dolomite		30,037	18,470	13,160	18,920	17,860
Gold, mine output[8]	kilograms	2,182	1,743 [r]	1,740	1,725	2,022
Granite		6,490	5,100	5,620	4,430	4,718
Iron and steel, steel, crude[4]		57,000	65,000	81,000 [r]	78,000 [r]	90,000
Limestone	thousand metric tons	1,411	1,432	1,489	1,441	1,506
Natural gemstones, agate and amethyst		13,751	18,356	20,490	19,970	21,996
Petroleum, refinery products[9]	thousand 42-gallon barrels	14,514 [r]	14,291 [r]	10,082 [r]	14,564 [r]	15,731
Stone, crushed	thousand metric tons	1,001	920	1,472	3,016	1,946

[e] Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r] Revised.

[1] Table includes data available through October 2, 2014.

[2] In addition to the commodities listed, construction materials (clays, limestone, marble, miscellaneous rock, and sand) were presumably produced, but available information was inadequate to make reliable estimates of output.

[3] Reported figure.

[4] Source: World Steel Association.

[5] In addition to the commodities listed, marble, and quartz were presumably produced, but available information was inadequate to make reliable estimates of output.

[6] Source: Ministerio de Industria, Energía y Minería, Dirección Nacional de Minería y Geología, Estadisticas de Produccion Minera 2009–13.

[7] Source: Federacion Interamericana del Cemento.

[8] Source: Orosur Mining Inc. Data are for fiscal year ending on May 31, 2013.

[9] Source: Administración Nacional de Combustibles, Alcohol y Portland (ANCAP). Numbers were converted into 42-gallon barrels from cubic meters using the U.S. Energy Information Administration conversion factor of 1 cubic meter = 6.289812 42-gallon barrels.

TABLE 2
PARAGUAY AND URUGUAY: STRUCTURE OF THE MINERAL INDUSTRIES IN 2013

(Thousand metric tons unless otherwise specified)

Country and commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
PARAGUAY			
Cement	Industria Nacional del Cemento (INC), 100%	Puerto Vallemi plant, about 350 kilometers northwest of Asuncion	1,060
Do.	do.	Villeta plant, about 25 kilometers south of Asuncion	730
Do.	Yguazu Cementos S.A. (Camargo Correa Group, Concret-Mix S.A., and Votorantim Cimentos S.A.)	Villa Hayes plant at Presidente Hayes Department	400
Petroleum, refinery products thousand 42-gallon barrels	Petróleos Paraguayos (Petropar), 100%	Villa Elisa refinery at Villa Elisa Municipality	2,700 [1]
Steel	Consorcio Siderúrgico de Paraguay (Cerro Lorito, 67%, and Cooperativa de Trabajadores de ACEPAR, 33%)	ACEPAR steel mill at Villa Hayes, about 25 kilometers northeast of Asuncion	150
URUGUAY			
Cement	Cementos Artigas S.A. (Votorantim Cimentos, 51%, and Cementos Molins S.A., 49%)	Mine and clinker plant in Lavalleja Department	500
Do.	Cementos del Plata S.A. [Administración Nacional de Combustibles, Alcohol y Portland (ANCAP), 99.25%]	Paysandu Plant in Paysandu Department and Minas plant in Lavalleja Department	530
Gold kilograms	Orosur Mining Inc. (OMI)	Mina de San Gregorio in Rivera Department, about 450 kilometers north of Montevideo	2,000
Iron and steel	Gerdau Laisa S.A.	Montevideo	90
Petroleum, refinery products thousand 42-gallon barrels	Administración Nacional de Combustibles, Alcohol y Portland (ANCAP)	La Teja oil refinery near Montevideo	18,000

[e] Estimated. Do., do. Ditto.

[1] Production operations were suspended in 2005. Evaluation of the feasibility of restarting the refinery was ongoing.

THE MINERAL INDUSTRY OF PERU

By Yadira Soto-Viruet

In 2013, Peru ranked third among the world's leading producers of copper, silver, tin, and zinc; fourth among the world's leading producers of molybdenum and lead; and fifth among the world's leading producers of gold. According to the Ministerio de Energía y Minas (MEM), in 2013, Peru was Latin America's leading producer of gold, lead, tin, and zinc; the second-ranked producer of cadmium, copper, molybdenum, selenium, and silver; and the fifth-ranked producer of iron ore. The country's world rankings for reserves of mineral commodities were as follows: second for silver; third for copper and zinc; fourth for lead and molybdenum; and ninth for gold. Peru ranked first in Latin America for reserves of silver, lead, and zinc and second for copper, gold, and molybdenum. In 2013, Peru's real gross domestic product (GDP) increased by 5.8% to about $168.8 billion[1] compared with $160.5 billion in 2012. The country's mining and hydrocarbons sectors accounted for about 12% of the total GDP (Banco Central de Reserva del Perú, 2014, p. 253; Brininstool, 2014; George, 2014; Katrivanos, 2014; Ministerio de Energía y Minas, 2014a, p. 26–27; Polyak, 2014; Tolcin, 2014a, b).

Minerals in the National Economy

In 2013, the value of the contribution of the mining and hydrocarbons sectors to the GDP increased by 5% compared with 3% in 2012. The mining of metals accounted for about 8% of the total GDP and about 64% of the total value of mining and hydrocarbons. The value of the mining of metals increased by 4% in 2013, which was attributed to the increases in the values of molybdenum (8%), copper and lead (7% each), and silver and zinc (6% each). The value of hydrocarbons increased by 7% in 2013, which was attributed to the increase in the value of natural gas liquids (21%) and natural gas (3%) (Banco Central de Reserva del Perú, 2014, p. 253, 258).

Peru's mining activity was broadly distributed among 22 of its 25 Regions. As of December, about 575 mining operations were in production and 464 in exploration throughout the country. In 2013, direct employment in the mining sector decreased by 3% to 208,383 compared with 213,991 in 2012. Of these 208,383 workers, about 13% worked in Junin Region; 13% in Arequipa Region; 10% in La Libertad Region; 9% in Pasco Region; 8% in Cajamarca Region; and 7% in Lima Region. In 2012 (the latest year for which data were available), about 99.7% of the workers were locals, and the remaining 0.3% were foreigners (Ministerio de Energía y Minas, 2014a, p. 12–13, 104–107).

As of December, the country's foreign direct investment (FDI) amounted to about $10 billion compared with $12 billion in 2012. The mining sector accounted for about 24% of the country's FDI, and petroleum accounted for about 3%. The main sources of FDI to Peru included Spain (20%), the United Kingdom (19%), the United States (14%), the Netherlands (7%), Chile (6%), and Brazil and Colombia (5% each) (ProInversión, 2015).

According to the MEM, the investment in the mining sector increased by about 14% to $9.7 billion compared with $8.5 billion in 2012. Infrastructure investments accounted for about 18% of the total mining investments, followed by beneficiation plant equipment (14%), mining (11%), and exploration and mining equipment (8% each). In 2013, investments in mining equipment increased by 48% to about $780 million compared with $525 million in 2012; beneficiation plant equipment increased by 23% to $1.4 billion compared with $1.1 billion in 2012; and mining, by 10% to $1.1 billion compared with $1.0 billion in 2012. In 2013, exploration and infrastructure investments decreased by 14% to $774 million and 5% to $1.7 billion, respectively (Ministerio de Energía y Minas, 2014a, p 90–97).

According to the MEM, the stability of the Peruvian judicial framework encouraged investment in mining projects, and leading foreign mining companies operating in Peru committed to invest $60 billion for the next 6 years. Of the $60 billion, about $28 billion (47%) was in the exploration phase, about $21 billion (35%) was for projects with approved environmental impact assessments (EIAs), and about $9 billion (15%) was for expansion projects. Most of the investment was from, in order of investment value, China ($14 billion, or 23%), the United States ($10 billion, or 17%), Canada ($9 billion, or 15%), Switzerland ($5 billion, or 9%), the United Kingdom ($5 billion, or 8%), Australia ($4 billion, or 6%), Mexico ($3 billion, or 5%), Brazil ($2 billion, or 4%), South Africa ($1 billion, or 2%), and Japan ($500 million, or 0.8%). Copper projects accounted for about 60% of the total investment followed by gold, 17%, and iron ore, 12% (Ministerio de Energía y Minas, 2014a, p. 99–101).

In 2013, Glencore plc of Switzerland (formerly known as Glencore Xstrata plc) was ranked first among the mining companies investing in the country, investing about $1.7 billion for the development of the Las Bambas project in Cotabambas, Apurimac Region, and accounted for 18% of the total mining investment, followed by Aluminum Corporation of China (Chinalco), through its subsidiary Minera Chinalco Peru S.A., which invested about $1.2 billion for the construction of the Toromocho concentrate plant in Yauli, Junin Region. The joint venture among Freeport-McMoRan of the United States (53.6%), Sumitomo Metal Mining Co. Ltd. of Japan (21.0%), and Compañía de Minas Buenaventura S.A.A. (Buenaventura, 19.6%), through its subsidiary Sociedad Minera Cerro Verde S.A.A. (Minera Cerro Verde), ranked third among the mining companies investing in the country. The joint venture invested about $1.1 billion for the expansion of the Cerro Verde beneficiation plant in Apurimac Region. In 2013, Apurimac Region received 18% of Peru's mining investments, followed by the Junin Region (16%), the Arequipa Region (14%), and the Cusco Region (12%) Regions (Banco Central de Reserva del Perú, 2014, p. 19; Ministerio de Energía y Minas, 2014a, p. 90–97).

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[1] Where necessary, values have been converted from Peruvian nuevo sols (PEN) to U.S. dollars (US$) at annual average exchange rates of PEN2.55=US$1.00 for 2012 and PEN2.76=US$1.00 for 2013.

Government Policies and Programs

The MEM was the Government agency responsible for the administration and the regulation of the energy and mining sector. The Instituto Geologico Minero y Metalurgico of the MEM is the authority responsible for all legal matters related to geoscience research and for the management of land and mining concessions. The Dirección General de Minería (DGM) of the MEM has the responsibility to address all legal matters related to mining sector policy. The Dirección General de Asuntos Ambientales of the MEM has the responsibility to address environmental problems that result from energy and mining activities and is mandated to implement environmental laws and regulations (Instituto Geologico Minero y Metalurgico, 2014; Ministerio de Energía y Minas, 2014c–e).

Perúpetro S.A. is a nonregulatory agency responsible for the promotion of hydrocarbon investments in the country (law No. 26221, Ley Organica de Hidrocarburos). Perúpetro negotiates, signs, and administers hydrocarbon contracts for which Perúpetro must compete with the private sector. Perúpetro was involved in the transportation, refining, and marketing of refined products and other derivatives of petroleum as well (Perúpetro S.A., 2014, p. 13).

In 2013, policies related to mining formalization and illegal mining activities were implemented, including Supreme Decree Nos. 025–2013–EM of July 25 (Dirección General de Formalización Minera [DGFM]) and 0032–2013–EM of August 24. The DGFM was responsible for proposing and evaluating the policy on mining formalization in accordance with sectorial and national policies and in coordination with the DGM. Supreme Decree No. 0032–2013–EM of August 24 also established mechanisms to continue and strengthen the process of formalization of small mining and artisanal mining (Supreme Decree Nos. 1102 and 006–2012–EM). Under Supreme Decree No. 0032–2013–EM, the MEM had until April 19, 2014, to complete the formalization process. As of yearend 2013, a total of 72,787 declaraciones de compromisos [declarations of commitment] were submitted to the MEM, 1,797 of which were canceled after the MEM confirmed the absence and (or) inaccuracy of information in the submitted declarations (Ministerio de Energía y Minas, 2013a, 2014a, p. 17).

The Peruvian Constitution of 1993 provides for regulations to guarantee a favorable legal framework to domestic and foreign investors who enter into agreements with the Government. The relevant laws governing domestic and foreign investment are Legislative Decree Nos. 662 and 757 and Supreme Decree No. 162–92–EF. Peru's tax framework for the mineral sector became effective on October 1, 2011, and included an amendment to the mining royalties act (law No. 29788), which applies to holders of mining concessions and concessionaires that undertake the exploitation of metallic and nonmetallic mineral resources (mining companies pay royalties of 1% to 12% based on operating profits); the special mining tax (law No. 29789), which applies to holders of mining concessions and assignees that undertake the exploitation of mineral resources (the special tax was determined and paid based on a progressive cumulative scale of operating margins with marginal rates ranging from 2% to 8.4%); and the special mining encumbrance (law No. 29790), which applies to mining companies that have tax stability agreements that cannot be affected by changes in the legislation regarding the special mining tax and mining royalties (the special mining encumbrance is determined and paid every quarter for each contract with marginal rates ranging from 4% to 13.12% (EY Perú, 2014, p. 132–135; ProInversión, 2014).

Peru was a compliant country of the Extractive Industries Transparency Initiative (EITI), meeting all the requirements in the EITI standard. EITI is a global coalition of governments, companies, and civil society working together to improve transparency and responsible management of revenues from natural resources, including gas, oil, metals, and minerals (Extractive Industries Transparency Initiative, 2014a, b; EY Perú, 2014, p. 79).

Production

In 2013, copper smelter production increased by 42% to 412,966 metric tons (t) from 290,088 t in 2012; placer gold, by 35% to 15,398 kilograms (kg) from 11,412 kg; electrolytic copper, by 29% to 271,792 t from 210,119 t; natural gas liquids, by 21% to 38.2 million barrels (Mbbl) from 31.6 Mbbl; steel hot-rolled products, by 13% to 1.4 million metric tons (Mt) from 1.2 Mt; and residual fuel oil, by 10% to 7.8 Mbbl from 7.1 Mbbl. Increases in output of industrial minerals were led by onyx (232%), slate (188%), boron (116%), bentonite (108%), travertine (65%), crude phosphate (43%), construction stone (35%), diatomite (33%), common clay (18%), and cement (11%). Marble production decreased by 99% to 225 t in 2013 from 16,335 t in 2012; tungsten metal, by 90% to 28 t from 276 t; barite, by 34% to 52,491 t from 79,451 t; sand, by 31% to 891,000 t from 1.3 Mt; anthracite, by 28% to 88,985 t from 123,771 t; crude gypsum, by 24% to 297,527 t from 390,705 t; feldspar, by 14% to 22,695 t from 26,359 t; electrowon copper, by 11% to 89,658 t from 101,174 t; and liquefied petroleum gas, by 10% to 2.0 Mbbl from 2.2 Mbbl. Data on mineral production are in table 1.

Structure of the Mineral Industry

Peru's leading copper companies included Compañia Minera Antamina S.A. (Antamina), which was a joint venture among BHP Billiton plc of the United Kingdom (33.75% interest), Glencore (33.75%), Teck Cominco Ltd. of Canada (22.5%), and Mitsubishi Corp. of Japan (10%); Minera Cerro Verde; and Southern Copper Corp., owned by Grupo Mexico S.A.B. de C.V. (82.3%). Molybdenum was produced as a byproduct of copper production by Antamina, Minera Cerro Verde, and Southern Copper. Minsur S.A. was the only producer of tin in the country; it had a production capacity of about 30,000 metric tons per year (t/yr). Table 2 lists the structure of the Peruvian mineral industry by principal commodities and major operating companies (Ministerio de Energía y Minas, 2014a, p. 41, 80, 82).

In 2013, cement was produced by Caliza Cementos Inca S.A., Cementos Pacasmayo S.A.A., Cementos Selva S.A., Cementos Sur S.A., Union Andina de Cementos S.A.A. (UNACEM), and Yura S.A. These companies had a combined cement production capacity of about 14.7 million metric tons per year (Mt/yr). UNACEM was created in 2012 after the merger between Cemento Andino S.A. and Cementos Lima S.A.A.

UNACEM operated the Atocongo plant, which was located in Villa Maria del Triunfo, Lima Region, and had a production capacity of about 5.5 Mt/yr, and the Condorcocha plant, which was located in Tarma, Junin Region, and had a production capacity of about 2.1 Mt/yr (Union Andina de Cementos S.A.A., 2012, p. 24; Asociacion de Productores de Cemento, 2014).

The largest oil refinery in the country continued to be La Pampilla, which had an installed capacity of 102,000 barrels per day (bbl/d) and was located in El Callao Province, Lima Region. Repsol YPF of Spain, through its subsidiary Repsol Peru B.V., held a 51.03% interest in La Pampilla, which accounted for about 50% of the country's refinery capacity. Petroperú S.A. owned the Talara oil refinery, which was located in Piura Region and had an installed capacity of 65,000 bbl/d; the Conchan oil refinery, which was located in Lima Region and had an installed capacity of 15,500 bbl/d; the Iquitos oil refinery, which was located in Loreto Region and had an installed capacity of 12,000 bbl/d; the Pucallpa oil refinery (operated by Maple Energy plc), which was located in Ucayali Region and had an installed capacity of 3,300 bbl/d; and the El Milagro oil refinery, which was located in Amazonas Region and had an installed capacity of 2,000 bbl/d (Navarro, 2012; Repsol Peru B.V., 2014, p. 31).

Mineral Trade

In 2013, Peru's total exports amounted to about $41.8 billion compared with $45.6 billion, which was 8% lower than the value of exports in 2012. Peru's mining sector, which included mining products, nonmetallic minerals, and iron and steel, accounted for about $25 billion or 60% of total export revenues in 2013 compared with almost $28 billion or about 61% of the total export revenues in 2012. The country's leading mining export partners were, in order of value, China (which received 26% of Peru's mining exports), Switzerland (13%), the United States (12%), Canada (11%), Japan (6%), the Republic of Korea (5%), and Brazil (4%). In 2013, the country's mining products, which included copper, gold, iron, lead, molybdenum, silver, tin, zinc and others, accounted for about $23 billion, or 55% of the total exports, and the petroleum and natural gas sector accounted for about $5.1 billion, or 12%. Copper and gold made up about 43% and 34%, respectively, of the total of Peru's mining products exports (Ministerio de Energía y Minas, 2014a, p. 31–33).

Copper exports in 2013 totaled 1.4 Mt and were valued at about $9.8 billion compared with 1.4 Mt valued at about $10.7 billion in 2012; this was a decrease in value of 8.6% compared with that of 2012 owing to the decrease in price of copper to $3.18 per pound in 2013 from $3.46 per pound in 2012. Leading copper export partners were, in order of value, China (which received about 20% of the country's copper exports), Japan (12%), Brazil and Germany (6% each), and the Republic of Korea and Italy (5% each) (Ministerio de Energía y Minas, 2014a, p. 33–35, 43).

The country's gold exports amounted to about 173,000 kg valued at $7.8 billion compared with about 178,000 kg valued at about $9.6 billion; the decrease in the export value was owing mainly to lower gold output and a decrease in the price of gold to $1,412 per troy ounce in 2013 from $1,670 per troy ounce in 2012. Peru's gold exports leading partners were, in order of value, Switzerland (which received about 38% of the country's gold exports), the United States (26%), and Canada (25%; Ministerio de Energía y Minas, 2014a, p. 33–35, 51).

Iron ore exports increased to 10.4 Mt valued at $857 million from 10.0 Mt valued at $856 million in 2012 despite the price decrease to $83.00 per metric ton in 2013 from $88.00 per metric ton in 2012. In 2013, China was the leading export partner (Ministerio de Energía y Minas, 2014a, p. 33–35, 78).

Exports of lead amounted to 847,000 t valued at more than $1.7 billion in 2013 compared with 1.2 Mt valued at about $2.6 billion in 2012; the decrease was attributed to the decrease in the price of lead to $0.94 per pound in 2013 from $1.00 per pound in 2012. Leading lead export partners were, in order of value, the Republic of Korea (which received about 25% of the country's lead exports), China (22%), Canada (21%), Belgium (9%), Japan (8%), and the United States (6%) (Ministerio de Energía y Minas, 2014a, p. 33–35, 75).

Exports of molybdenum amounted to 18,000 t valued at more than $358 million in 2013 compared with 18,000 t valued at about $431 million in 2012; the decrease was attributed to the decrease in the price of molybdenum to $8.81 per pound in 2013 from $10.91 per pound in 2012 (Ministerio de Energía y Minas, 2014a, p. 33–35).

Exports of silver amounted to about 659 t (reported as 21.2 million troy ounces) valued at $479 million in 2012 compared with about 218 t (7.0 million troy ounces) valued at about $210 million in 2012, despite a price decrease to $23.00 per troy ounce in 2013 from $30.00 per troy ounce in 2012. Leading silver export partners were, in order of value, the United States (which received about 71% of the country's silver exports), Brazil (17%), and Canada (9%) (Ministerio de Energía y Minas, 2014a, p. 33–35, 59).

The country's tin exports in 2013 totaled more than 22,000 t and were valued at almost $496 million compared with 26,000 t valued at more than $541 million in 2012; this was about an 8.3% decrease in value compared with that of 2012, despite tin prices increasing to $10.10 per pound in 2013 from $9.48 per pound in 2012. In 2013, the United States received about 42% of the country's tin exports, followed by the Netherlands, 28%; and Japan, 12% (Ministerio de Energía y Minas, 2014a, p. 33–35, 80).

Zinc exports in 2013 totaled 1.1 Mt and were valued at about $1.4 billion compared with 1.0 Mt with about the same value in 2012; prices decreased to $0.59 per pound in 2013 from $0.60 per pound in 2012. Peru's zinc exports partners were, in order of value, China (which received about 22% of the country's zinc exports), Spain and the Republic of Korea (16% each), Brazil (10%), Japan and Belgium (7% each), and the United States (6%). In 2013, crude petroleum and derivatives exports totaled about 38.7 Mbbl compared with 35.6 Mbbl in 2012, and natural gas exports totaled about 9.6 million cubic meters compared with about 8.7 million cubic meters in 2012 (Banco Central de Reserva del Perú, 2014, p. 279; Ministerio de Energía y Minas, 2014a, p. 33–35, 67).

Peru's exports to the United States were valued at about $8.1 billion in 2013 compared with about $6.4 billion in 2012. Of this amount, nonmonetary gold accounted for about $2.6 billion (or 32% of the country's total exports to the United States, by value), petroleum products accounted for about $992 million, crude oil accounted for about $384 million, tin accounted for about $252 million, zinc accounted for about $148 million, and copper accounted for about $89 million. In 2013, imports from the United States were valued at about $10.1 billion compared with about $9.3 billion in 2012; these included about $2.2 billion in fuel oil, about $754 million in petroleum products, and about $458 in excavating machinery (U.S. Census Bureau, 2014a, b).

Commodity Review

Metals

Copper.—In 2013, the country remained the world's third-ranked producer of copper and accounted for about 7.3% of world production. In 2012 (the latest year for which data were available), proven and probable reserves were reported as 68.4 Mt of copper. In 2013, Ancash Region was ranked first among the country's copper-producing regions, accounting for about 34% of the amount produced, followed by teh Arequipa Region (19%), the Moquegua Region (13%), the Cusco Region (11%), and Tacna Region (10%). Peru's leading copper companies were, in order of output, Antamina (which accounted for about 34% of the country's total copper production), Southern Copper (22%), and Minera Cerro Verde (19%) (table 3; Ministerio de Energía y Minas, 2014a, p. 38–42).

In 2013, about $35.8 billion of the planned investments was for copper projects. Of these projects, those under construction included Las Bambas ($5.2 billion), which is located in Apurimac Region and is owned by Glencore (100%); Minas Conga ($4.8 billion), which is located in Cajamarca Region and is owned by Minera Yanacocha S.R.L. [a joint venture among Newmont Mining Corp. of the United States (51.3%), Buenaventura (43.7%), and International Finance Corp. (5.0%)]; Quellaveco ($3.3 billion), which is located in Moquegua Region and is a joint venture between Anglo American plc. of the United Kingdom (81.9%) and Mitsubishi Corp. of Japan (18.1%); and Constancia ($1.8 billion), which is located in Cusco Region and is owned by Hudbay Minerals Inc. of Canada (100%). Expansion projects included Toquepala ($600 million), which is located in Tacna Region and is owned by Southern Copper, and Cerro Verde ($4.4 billion), which is located in Arequipa Region and is owned by Minera Cerro Verde.

Exploration projects included Haquira ($2.8 billion), which is located in Apurimac Region and is owned by Antares Minerals Inc. of Canada through its subsidiary Minera Antares Peru S.A.C.; Galeno ($2.5 billion), which is located in Cajamarca Region and is owned by Lumina Copper S.A.C.; Los Chancas ($1.6 million), which is located in Apurimac Region and is owned by Southern Copper; Rio Blanco ($1.5 million), which is located in Piura Region and is owned by Zijin Mining Group Co. Ltd. of China through its subsidiary Rio Blanco Copper S.A.; and Los Calatos ($1.3 billion), which is located in Moquegua Region and is owned by Mentminco Ltd. of Australia through its subsidiary Minera Hampton Perú S.A.C. (Ministerio de Energía y Minas, 2014a, p. 100–102).

The Constancia project had the potential to be developed as an open pit mine and have the capacity to produce 82,000 t/yr of copper during a mine life of 22 years. Hudbay expected to begin initial production in late 2014 and commercial production by mid-2015. As of September 30, 2013, measured mineral resources at Constancia were reported as 68 Mt at an average grade of 0.22% copper, 0.0059% [reported as 59 grams per metric ton (g/t)] molybdenum, 0.036 g/t gold, and 2.17 g/t silver. Indicated mineral resources were estimated to be 293 Mt at an average grade of 0.20% copper, 0.0058% (or 58 g/t) molybdenum, 0.033 g/t gold, and 1.96 g/t silver, and inferred resources were estimated to be 200 Mt at an average grade of 0.19% copper, 51 g/t molybdenum, 0.031 g/t gold, and 1.86 g/t silver (Hudbay Minerals Inc., 2014a, p. 3, 7; 2014b).

In July, Glencore announced that it would sell 100% of its stakes in Las Bambas project, in accordance with the merger remedy commitments made to the Ministry of Commerce of China for the Xstrata acquisition. Las Bambas project had the potential to be developed as an open pit mine and the potential to produce about 400,000 t/yr of copper and 5,000 t/yr of molybdenum (Glencore Xstrata plc, 2014, p. 159; Ministerio de Energía y Minas, 2014b, p. 26).

In December, Chinalco began operations in the Toromocho open pit mine. The company held 100% interest in the project, which was located in the Morococha District, Junin Region, and had the capacity to produce 1.0 Mt/yr of copper concentrate, 10,000 t/yr of molybdenum, and 113 t/yr of silver oxide. The company planned to invest an additional $1.3 billion to further expand capacity at the Toromocho Mine. Reserves at the Toromocho Mine were reported to be about 1,526 Mt at average grades of 0.48% copper, 0.019% molybdenum, and 6.88 g/t silver (Emery, 2013; Gestión, 2013; Minera Chinalco Peru S.A., 2014a, b).

Gold.—In 2013, the country's total gold production was 151,486 kg compared with 161,544 kg in 2012. The decrease in production was attributed to a decrease in gold production from the leading producers of the country, which included Minera Yanacocha (which accounted for about 21% of the country's total gold production), Minera Barrick Misquichilca S.A. (14%), and Buenaventura (5%). In 2013, gold production from Minera Yanacocha decreased by 24% owing to the shutdown of the Chaupiloma Este and Chaupiloma Doce units and the decrease in production at Chaupiloma Sur. Gold production from Minera Barrick Misquichilca and Buenaventura decreased by 19% and 9%, respectively. Gold production from La Libertad Region accounted for about 31% of the country's total gold production, followed by Cajamarca (30%) and Madre de Dios (11%) Regions (Ministerio de Energía y Minas, 2014a, p. 46–50).

In January, Minsur S.A. began operation at the Pucamarca open pit gold mine, which was located in Cerro Checocollo, Tacna Region. In 2013, the company produced 4,919 kg of dore at average grades of 73.77% gold and 18.60% silver. During the year, Minsur began a drilling exploration program in the surrounding areas of the open pit and expected to have results by the first quarter of 2014. In August, Barrick Gold Corp. of Canada initiated closure activities at the Pierina open pit mine, stating that these were in line with the disciplined capital allocation framework announced in 2012. Pierina, which was located in the Andean Cordillera, Ancash Region, produced about 2,750 kg of gold in 2013. As of 2012, proven and probable mineral reserves at Pierina were estimated to be 50 Mt at an average grade of 0.3 g/t gold (Barrick Gold Corp., 2014, p. 20, 23, 56, 150; Minsur S.A., 2014, p. 41–42).

In 2013, about $9.8 billion of planned investments was for gold projects. The development projects included the Inmaculada property ($370 million), which is located in Ayacucho Region and owned by Minera Suyamarca S.A.C. (Hochschild Mining plc of the United Kingdom, 100%), and the Ollachea property ($170 million), which is located in Puno Region and owned by Minera Kuri Kullu S.A. (Minera IRL Ltd., 100%). The exploration projects would include the Minas Chucapapa project ($1.2 billion), which is located in Moquegua Region and owned by Canteras del Hallazgo S.A.C. (Gold Fields Ltd. of South Africa, 51%, and Buenaventura, 49%), and the Anama project ($40 million), which is located in Apurimac Region and owned by Anabi S.A.C. (Grupo Minero Aruntani, 100%), among others (Ministerio de Energía y Minas, 2014a, p. 100–102).

Iron Ore.—Shougang Corp. of China, through its subsidiary Shougang Hierro Perú S.A.A., continued to be Peru's sole iron ore producer. Shougang's $1.5 billion expansion project at the Marcona iron ore mine was underway and was expected to be completed by 2016. The company expected to increase production capacity to 20 Mt/yr. As of 2013, proven and probable reserves at the Marcona Mine, which was located in the Marcona District, Ica Region, were estimated to be more than 1.7 billion metric tons of iron (Banco Central de Reserva del Perú, 2014, p. 35; Ministerio de Energía y Minas, 2014a, p. 102; 2014b, p. 4, 10; Shougang Hierro Perú S.A.A., 2014, p. 5).

In 2013, about 11.9% ($7.1 billion) of planned investments for iron ore projects included the exploration projects at Pampa de Pongo ($3.3 billion), which is located in Arequipa Region and is owned by Jinzhao Mining Peru S.A. (Chinese companies Nanjinzhao Group Co. Ltd. and Zibo Hongda Mining Co. Ltd.), and Hierro Apurimac ($2.3 billion), which is located in Apurimac Region and is owned by Apurimac Ferrum S.A. (Strike Resources of Australia). Pampa de Pongo was expected to have a production capacity of about 15 Mt/yr and to be completed by 2016, and Hierro Apurimac was expected to begin operations by 2020 and to have a production capacity of about 20 Mt/yr (Grabski, 2013; Ministerio de Energía y Minas, 2014a, p. 78–79, 100–102; 2014b, p. 35, 38).

Lead, Silver, and Zinc.—The production of lead increased by 7% to 266,263 t in 2013 from 248,659 t in 2012. The increase was attributed to an increase in the production of the Compañía Minera Milpo S.A. (Milpo), which increased production by 67% to 29,646 t in 2013 from 17,780 t in 2012; Empresa Administradora Chungar S.A.C., which increased production by 15% to 28,637 t in 2013 from 24,903 t in 2012; and Buenaventura, which increased production by 13% to 21,572 t in 2013 from 19,152 t in 2012. The increase in production by Milpo was attributed to an expansion of the installed capacity at Cerro Lindo to about 14,990 metric tons per day in 2012. In 2013, the Pasco Region was ranked first among the country's leading producing regions and accounted for about 34% of the tonnage produced followed by Junin Region and Lima Region, which accounted for about 17% each (Ministerio de Energía y Minas, 2014a, p. 70–73).

In 2013, silver production increased by 5% to 3,407 t from 3,245 t in 2012; the increase was owing mainly to increases in production of 26% by Antamina and 16% by Buenaventura. Peru's leading silver producers were, in terms of output, Antamina and Buenaventura, each of which produced about 14% of the country's total silver production, and Volcan Compañia Minera S.A.A. (Volcan), 9%. Pasco Region was ranked first among the country's silver producing regions and accounted for about 26% of the amount produced, followed by Ancash Region (18%) and Junin Region (14%) Regions (Ministerio de Energía y Minas, 2014a, p. 54–57).

Zinc production increased by about 5% in 2013 compared with that of 2012; the increase was attributed to increases in production of 21% by Milpo and 17% by Antamina. The country's leading zinc producers were, by tonnage of output, Antamina (which produced about 23% of the country's total zinc production), Milpo (17%), and Volcan (12%). The leading producing regions were, in order of output, Ancash Region (which produced about 28% of the country's zinc production), Pasco Region (21%), Junin Region (18%), Lima Region (13%), and Ica Region (12%) (Ministerio de Energía y Minas, 2014a, p. 62–65).

In 2013, investments for silver and zinc projects were valued at $1.6 billion. Investments for silver included the development of the Corani silver, lead, and zinc project ($600 million), which was wholly owned by Bear Creek Mining Corp. of Canada. In September, the MEM approved the company's environmental and social impact assessment for Corani, which was located in Puno Region. In 2011, a feasibility study reported that the project had the potential to be developed as an open pit mine and to produce about 380 t of silver during the first 5 years. The company expected to update its feasibility study by 2015. As of November 2011, measured and indicated resources at Corani were estimated to be 134.5 Mt at average grades of 20.5 g/t silver, 0.38% lead, and 0.29% zinc, and inferred resources, 49.8 Mt at average grades of 30 g/t silver, 0.46% lead, and 0.28% zinc. Proven and probable reserves were estimated to be 156.1 Mt at average grades of 53.8 g/t silver, 0.90% lead, and 0.49% zinc. Investments for zinc included the exploration project at Hilarion ($470 million), which is located in the Huallanca District, Ancash Region, and is owned by Milpo (Bear Creek Mining Corp., 2014a, p. 6, 8; 2014b, p. 4–6; Ministerio de Energía y Minas, 2014a, p. 100–102).

Molybdenum.—Molybdenum production increased by 8% to 18,140 t in 2013 from 16,790 t in 2012. The increase was attributed to production increases of 46% by Minera Cerro Verde and 6% by Southern Peru Copper. In 2013, Minera Cerro Verde accounted for about 43% of the total molybdenum production, and Southern Copper, for about 25% (Banco Central de Reserva del Perú, 2014, p. 35; Ministerio de Energía y Minas, 2014a, p. 82).

Tin.—Minsur owned the San Rafael underground mine, which is located in the Antauta District, Puno Region. Production of tin concentrate was 23,688 t in 2013 compared with 26,105 t in 2012. In 2013, Minsur continued with its exploration and development program at San Rafael. By yearend, the company reported that measured and indicated mineral resources were estimated to be 4.4 Mt at an average grade of 3.98% tin, and inferred mineral resources were estimated to be 1.3 Mt at an average grade of 3.09% tin. Proven and probable reserves were estimated to be 4.5 Mt at an average grade of 2.24% tin. Concentrates from San Rafael were processed at Minsur's tin smelting and refining operations located in Pisco, Ica Region (Minsur S.A., 2014, p. 29, 31).

Industrial Minerals

Phosphate Rock.—Vale S.A. of Brazil held a 40% interest in Compañia Minera Miski Mayo S.A.C. in joint venture with Mosaic Co. of the United States (35% interest) and Mitsui & Co., Ltd. of Japan (25% interest). Compañia Minera Miski Mayo operated the Bayovar open pit mine, which was located in Sechura, Piura Region, and had the capacity to produce about 3.9 Mt/yr. Expansion plans are underway at Bayovar to increase the production capacity of the mine to 5.8 Mt/yr at an investment cost of about $520 million. The expansion program was expected to be completed in 2014. In 2013, total proven and probable reserves at Bayovar were estimated to be about 415.9 Mt at an average grade of 15.5% of phosphorus pentoxide (P_2O_5) compared with 225.4 Mt at an average grade of 17.2% P_2O_5 in 2012. The increase in reserves was attributed to the inclusion of two new phosphate seams in the mining plan and a new mining strategy that uses a higher dilution in order to maximize recovery (Horizonte Minero, 2013; Ministerio de Energía y Minas, 2014a, p. 100, 102; Vale S.A., 2014, p. 49, 68).

In September, Focus Ventures Ltd. of Canada, through its subsidiary Agrifos Peru S.A.C, signed a binding letter of intent with Juan Paulo Quay S.A.C. (JPQ) for the exploration and acquisition of the Bayovar 12 phosphate mining concession, which is located adjacent to Vale's Bayovar Mine. JPQ was owned by Grupo Romero and Mamut Andino C.A. of Ecuador. The agreement included the option to acquire a 70% interest in Bayovar 12 by investing about $15 million in exploration and the completion of a prefeasibility study, which was expected to be completed in 2014. After the prefeasibility study results, Focus Ventures would have the option to acquire or refuse the purchase of the remaining 30% interest from JPQ. The Bayovar 12 concession is located in Sechura Province, Piura Region, in northwestern Peru (Focus Ventures Ltd., 2013).

Mineral Fuels

Natural Gas and Petroleum.—In 2013, gross natural gas production increased by 3% to 12,192 million cubic meters from 11,859 million cubic meters in 2012. Pluspetrol S.A. of Argentina remained the leading natural gas producer in Peru, accounting for 97% of the domestic production, followed by Aguaytia Energy del Peru S.R.L. (1%) and Petróleo Brasileiro S.A. (Petrobras) of Brazil (0.6%). In 2013, natural gas liquids production increased by 21% to 38.2 Mbbl from 31.6 Mbbl; Pluspetrol accounted for about 96% of the domestic natural gas liquids production. As of December 31, Peru's natural gas reserves (proven, probable, and possible) were estimated to be 762.2 billion cubic meters, and natural gas liquids reserves (proven, probable, and possible) were estimated to be 1.5 billion barrels (Gbbl) (Ministerio de Energía y Minas, 2013b, p. 17, 23; Perúpetro S.A., 2013b, p. 12, 14).

In 2013, Peru's total crude oil production decreased by about 6% to about 23 Mbbl from 24.4 Mbbl in 2012. As of December 31, Peru's proven, probable, and possible mineral reserves of crude oil totaled 1.5 Gbbl. Daily petroleum consumption in the country averaged 171,000 barrels (bbl) in 2013 compared with 172,000 bbl in 2012. The country's leading petroleum producers were, in order of volume, Pluspetrol Norte S.A. (owned by Pluspetrol), which operated Blocks 8 and 1–AB and accounted for about 39% (8.9 Mbbl) of domestic production; Petrobras, which operated Block X and accounted for about 18% (4.2 Mbbl) of domestic production; and SAVIA Peru S.A., which operated Blocks Z–2B and Z–6 and accounted for about 16% (3.7 Mbbl) of domestic production (Ministerio de Energía y Minas, 2013b, p. 11; Perúpetro S.A., 2013b, p. 12; U.S. Energy Information Administration, 2014)

In November, Petrobras signed the documents for the sale (100% shares) of its wholly owned subsidiary Petrobras Energía Peru to China National Petroleum Corp. at a cost of about $2.6 billion. The sale included a 100% stake in Block X, which is located in the Talara Basin; a 100% stake in exploration Block 58, which is located in Cusco Region; and a 46.2% stake in exploration Block 57, which was a joint venture among Repsol Exploracion Peru S.A. and Sucursal del Peru. The completion of the sale would be subject to the approval of the Chinese and Peruvian Governments. As of December 31, proven, probable, and possible mineral reserves at Block X were estimated to be 128 Mbbl, 30.5 Mbbl, and 11.3 Mbbl, respectively (Cespedes and Wade, 2013; Petróleo Brasileiro S.A., 2013a, p. 56; 2014b; Perúpetro S.A., 2013b, p. 12, 16; 2014, p. 16–17).

Perenco Group of the United Kingdom, through its subsidiary Perenco Peru Petroleum Ltd., held a 50% interest in Block 67, which is located in the Marañon Basin. In December, Perenco began operations in the block at an investment cost of about $712 million. By yearend 2013, the block produced about 14,363 bbl of petroleum, which was valued at about $1.7 million. The company expected to increase daily production to about 6,000 bbl in 2014 and 12,000 bbl by 2015. Proven reserves at the Block 67 were estimated to be 100 Mbbl of heavy oil (Perúpetro S.A., 2013a, b, p. 12, 16; 2014, p. 16–17).

Production of refinery products decreased by 6% to 56 Mbbl in 2013 from 59 Mbbl in 2012. Repsol invested about $61.3 million in 2013 to fund the development of a new diesel desulfurization plant (which was expected to begin operation by 2016), the expansion of its asphalt plant, and other projects, such as the use of natural gas to substitute liquids fuels (Banco Central de Reserva del Perú, 2014, p. 20; Repsol Peru B.V., 2014, p. 25, 89).

Reserves and Resources

Table 3 lists Peru's reserves of major minerals. According to the MEM, the country accounted for about 17% of the world's silver reserves, about 10% each of copper and zinc reserves, about 8% of molybdenum reserves, and about 4% each of gold and lead reserves (Ministerio de Energía y Minas, 2014a, p. 26).

Outlook

Peru's GDP was expected to increase by 3.6% in 2014. Peru continues to be on a path of economic growth owing to the country's macroeconomic stability and laws that encourage investment by way of new joint ventures and consortia, privatizations, and direct acquisitions, which are expected to continue to generate additional investments. Peru's legal framework and EITI compliance are expected to continue to be favorable to foreign investments in the fields of energy, mining, and related industries. The mining sector is expected to continue to be a major source of taxes and employment in the country. The Government's plans to establish policies related to mining formalization and illegal mining activities are likely to add revenues and to strengthen the mineral sector. In the long run, new projects and expansion projects in the nonfuel mineral sector, including copper, gold, iron, silver, and phosphate rock, are likely to attract investment, to increase interest in mineral prospecting, and to encourage mining companies to invest in expanding and modernizing their operations. Mining exports (copper, gold, lead, molybdenum iron, silver, tin, and zinc) are likely to increase in 2014 to $23.1 billion (EY Perú, 2014, p. 69; International Monetary Fund, 2014, p. 58).

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TABLE 1
PERU: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
METALS						
Antimony, metal		145	--	--	--	--
Arsenic, white[3]		301	--	--	--	--
Bismuth, metal		423	--	--	--	--
Cadmium, metal		289	357	572	684	695
Copper:						
Mine output, Cu content		1,113,454	1,094,123	1,094,971	1,197,560 [r]	1,285,982
Metal:						
Smelter		325,788	312,968	299,004	290,088	412,966
Refined, primary:						
Electrowon		162,795	153,022	140,341	101,174 [r]	89,658
Electrolytic		260,618	240,616	227,320	210,119	271,792
Total		423,413	393,638	367,661	311,293 [r]	361,450
Gold:						
Mine	kilograms	166,780	145,109	143,697	150,132 [r]	136,088
Placer	do.	17,215	18,975	22,490	11,412	15,398
Total	do.	183,995	164,084	166,187	161,544 [r]	151,486
Indium	do.	1,629 [r]	-- [r]	2,499 [r]	11,080 [r]	11,000
Iron and steel:						
Iron ore and concentrate:						
Gross weight	thousand metric tons	6,698	9,160	10,626	10,132	10,126
Fe content	do.	4,490	6,140	7,123	6,792	6,788
Metal:[4]						
Direct-reduced iron		100	100	94 [r]	98	93
Steel:						
Crude	thousand metric tons	718	880	877	981	1,069
Hot-rolled products	do.	876	1,076	926	1,211	1,367

See footnotes at end of table.

TABLE 1—Continued
PERU: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
METALS—Continued						
Lead:						
Mine output, Pb content		302,459	261,990	230,199	248,659	266,263
Metal		26,599	--	--	--	467
Molybdenum, mine output, Mo content		12,297	16,963	19,141	16,790	18,140
Selenium, metal, refined	kilograms	61,000	59,000	54,000	50,000 [r, e]	50,000 [e]
Silver:						
Mine output, Ag content		3,923	3,640	3,419	3,245 [r]	3,407
Metal, refined		445	156	171	159	163
Tellurium, metal	kilograms	7,000	--	--	--	--
Tin:						
Mine output, Sn content		37,503	33,848	28,882	26,105	23,688
Metal		34,388	36,451	32,290	24,811	24,181
Tungsten, metal[5]		502 [r]	571 [r]	439 [r]	276 [r]	28
Zinc:						
Mine output, Zn content		1,512,931	1,470,450	1,256,383	1,280,949 [r]	1,350,874
Metal		149,494	223,112	313,714	319,280	346,362
INDUSTRIAL MINERALS						
Barite		27,881	52,275	87,848 [r]	79,451 [r]	52,491
Boron materials, crude (borates)		187,221	292,855	-- [r]	104,072	224,454
Cement, hydraulic[e]	thousand metric tons	8,100	8,300 [r]	8,500 [r]	9,500 [r]	10,527 [6]
Chalk		321,012	325,000	322,000	321,711	322,000 [e]
Clays:						
Bentonite		119,452	44,266	27,534	22,977	47,743
Kaolin		9,655	16,678	18,169	34,585 [r]	32,249
Common clay		2,048,130	1,120,043	1,021,502	1,098,267	1,291,939
Diatomite		9,946	10,500	10,100	93,996	124,917
Feldspar		5,154	3,589	11,645	26,359	22,695
Gypsum, crude		321,012 [r]	313,025 [r]	481,770 [r]	390,705 [r]	297,527
Phosphate rock:						
Crude, gross weight	thousand metric tons	--	1,134 [r]	8,889 [r]	10,346 [r]	14,842
P_2O_5 content	do.	--	741 [r]	762 [r]	768 [r]	774
Salt, all types		1,567,279	1,570,000	1,565,000	1,199,585	1,205,435
Stone and sand and gravel:						
Stone:						
Limestone	thousand metric tons	10,304	11,528	11,594 [r]	16,306	16,650
Marble		338	--	--	16,335	225
Onyx		2,983 [r]	823 [r]	14,455 [r]	3,578	11,873
Quartz and quartzite, crushed[e]		124,000	124,000	124,000	87,481 [7]	87,500
Slate		16,447 [r]	315 [r]	18,165 [r]	33,948 [r]	97,630
Travertine		97,937	105,392	126,200 [r]	149,202 [r]	245,875
Sand and gravel:						
Stone, construction	thousand metric tons	5,541	4,613	4,374 [r]	5,343	7,227
Sand	do.	2,908	1,909	1,070 [r]	1,292 [r]	891
Talc		13,359	19,767	28,296	31,559	32,899
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite, run-of-mine		66,244	63,381	76,928	123,771	88,985
Bituminous, run-of-mine		75,845	57,571	105,553	102,587	99,606
Total		142,089	120,952	182,481	226,358	188,591
Natural gas:						
Gross[7]	million cubic meters	3,474	7,238 [r]	11,360	11,859	12,192
Marketed	do.	2,003	2,251	3,523	3,678	3,800 [e]
Natural gas liquids[8]	thousand 42-gallon barrels	27,100	30,832	30,354	31,596	38,187

See footnotes at end of table.

TABLE 1—Continued
PERU: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:						
Crude[8]	thousand 42-gallon barrels	25,927	26,531	25,387	24,396	22,956
Refinery products:[7]						
Liquefied petroleum gas	do.	2,177	2,424	2,221	2,196	1,983
Gasoline, motor	do.	14,713	15,185	14,037	13,773	12,580
Jet fuel	do.	4,703	5,290	5,200	5,851	5,408
Kerosene	do.	338	80	64	-- [r]	--
Distillate fuel oil	do.	25,819	24,606	30,979	28,798 [r]	26,414
Lubricants	do.	331	315	281	250	253
Residual fuel oil	do.	10,263	10,124	9,207	7,104 [r]	7,836
Asphalt	do.	1,663	1,841	1,436	1,504	1,424
Total	do.	60,007 [r]	59,865 [r]	63,425 [r]	59,476 [r]	55,898

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1] Table includes data available through November 25, 2014.

[2] Source: Ministerio de Energía y Minas del Perú, Anuario Minero, 2013.

[3] Output reported by Doe Run Perú S.R.L.

[4] Source: World Steel Association, Steel Statistical Yearbook 2014.

[5] Source: Malaga Inc., 2009–2012.

[6] Reported figure.

[7] Source: Ministerio de Energía y Minas del Perú, Anuario Estadistico de Hidrocarburos, 2013.

[8] Source: Banco Central de Reserva del Perú, Memoria, 2013.

TABLE 2
PERU: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Andalusite		Andalucita S.A. (private, 100%)	Paita, Piura Region	60
Antimony	metric tons	Doe Run Perú S.R.L. (Doe Run Co., 100%)	Smelter at La Oroya, Junin Region	700
Bentonite		Minera Doña Herminia S.A.	Amatape, Piura Region	NA
Bismuth	metric tons	Doe Run Perú S.R.L. (Doe Run Co., 100%)	Refinery at La Oroya, Junin Region	1,000
Cadmiun		Votorantim Metais - Cajamarquilla S.A. (Grupo Votorantim Metais S.A., 99%, and employees, 1%)	Refinery at Cajamarquilla, Lima Region	700
Cement		Caliza Cementos Inca S.A. (private, 100%)	Cajamarquilla plant, Lima Region	400
Do.		Cementos Pacasmayo S.A.A. (private, 100%)	Pacasmayo plant, La Libertad Region	2,900
Do.		Cementos Selva S.A. (Cementos Pacasmayo S.A.A.)	Rioja plant, San Martin Region	440
Do.		Cementos Sur S.A. (private, 100%)	Arequipa plant, Arequipa Region	340
Do.		Union Andina de Cementos S.A.A. (private, 100%)	Atocongo plant, Lima Region	5,500
Do.		do.	Condorcocha plant, Junin Region	2,100
Do.		Yura S.A. (private, 100%)	Yura plant, Arequipa Region	3,000
Copper		Compañía Minera Antamina S.A. (BHP Billiton plc, 33.75%; Glencore Xstrata plc, 33.75%; Teck Cominco Ltd., 22.5%; Mitsubishi Corp., 10%)	Antamina Mine, Ancash Region	500
Do.		Compañía Minera Condestable S.A. (Southern Peaks Mining LP, 98.7%)	Condestable Mine, Lima Region	25
Do.		Compañía Minera Milpo S.A. (Votorantim Metais - Cajamarquilla S.A., 49.89%)	El Porvenir Mine, Pasco Region; Cerro Lindo Mine, Ica Region	40
Do.		Doe Run Peru S.R.L. (Doe Run Co., 100%)	Cobriza Mine, Huancavelica Region	20
Do.		do.	Smelter at La Oroya, Junin Region	70
Do.		do.	Refinery at La Oroya, Junin Region	80

See footnotes at end of table.

TABLE 2—Continued
PERU: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Copper—Continued		Empresa Minera Los Quenuales S.A. (Glencore Xstrata plc, 97.6%)	Iscaycruz and Yauliyacu Mines, Lima Region	7
Do.		Glencore Xstrata plc, 100%	Tintaya Mine, Cusco Region	90
Do.		Gold Fields La Cima S.A. (Gold Fields Ltd., 99.53%)	Cerro Corona Mine, Cajamarca Region	40
Do.		Southern Copper Corp. (Grupo Mexico S.A.B. de C.V., 82.3%)	Cuajone Mine, Moquegua Region; Toquepala Mine, Tacna Region	200
Do.		do.	Smelter at Ilo, Moquegua Region	360
Do.		do.	Refinery at Ilo, Moquegua Region	360
Do.		Sociedad Minera Cerro Verde S.A.A. (Freeport-McMoRan Inc., 53.56%; Sumitomo Metal Mining Co. Ltd., 21%; Compañía de Minas Buenaventura S.A.A., 19.58%; others, 5.86%)	Cerro Verde Mine, Arequipa Region	300
Do.		Sociedad Minera El Brocal S.A.A. (private, 100%)	Tajo Norte Mine, Pasco Region	30
Gold	kilograms	Arasi S.A.C. (private 100%	La Rescatada Mine, Lampa, Puno Region	3,000
Do.	do.	Aruntani S.A.C. (private, 100%)	Tucari Mine, Moquegua Region	5,000
Do.	do.	Compañía de Minas Buenaventura S.A.A. (private, 100%)	Orcopampa Mine, Arequipa Region; Breapampa Mine, Ayacucho Region	8,500
Do.	do.	Compañía Minera Aurífera Santa Rosa S.A. (private, 100%)	Santa Rosa, Arequipa Region	5,000
Do.	do.	Compañia Minera Caraveli S.A., 100%	Caraveli, Arequipa Region	1,100
Do.	do.	Compañía Minera Coimolache S.A. (Compañía de Minas Buenaventura S.A.A., 40%; Southern Copper Corp, 44%; ESPRO SAC, 16%)	Tantahuatay Mine, Hualgayoc, Carjamarca Region	4,000
Do.	do.	Compañía Minera Poderosa S.A. (private, 100%)	Poderosa, La Libertad Region	4,000
Do.	do.	Consorcio Minero Horizonte S.A. (private, 100%)	Parcoy, La Libertad Region	6,000
Do.	do.	Gold Fields La Cima S.A. (Gold Fields Ltd., 99.53%)	Cerro Corona, Cajamarca Region	6,000
Do.	do.	La Arena S.A. (Rio Alto Mining Ltd., 100%)	La Arena Mine, Sanchez Carrion, La Libertad Region	6,200
Do.	do.	Minera Aurífera Retamas S.A. (private, 100%)	Retamas Mine, La Libertad Region	5,000
Do.	do.	Minera Barrick Misquichilca S.A. (Barrick Gold Corp., 100%)	Pierina Mine, Ancash Region; Laguna Norte Mine, La Libertad Region	36,000 [1]
Do.	do.	Minera La Zanja S.R.L. (Compañía de Minas Buenaventura S.A.A., 53.06%, and Newmont Mining Corp., 46.94%)	La Zanja Mine, Cajamarca Region	4,000
Do.	do.	Minera Yanacocha S.R.L. (Newmont Mining Corp., 51.35%; Compañía de Minas Buenaventura S.A.A., 43.65%; The World Bank's International Finance Corp., 5%)	Yanacocha Mine, Cajamarca Region	130,000
Iron ore		Shougang Hierro Perú S.A.A. (Shougang Corp., 100%)	Marcona, Ica Region	10,000
Lead		Compañía de Minas Buenaventura S.A.A. (private, 100%)	Julcani Mine, Huancavelica Region; Mallay and Uchucchacua Mines, Lima Region	50
Do.		Compañía Minera Antamina S.A. (CMA) (BHP Billiton plc, 33.75%; Glencore Xstrata plc, 33.75%; Teck Cominco Ltd., 22.5%; Mitsubishi Corp., 10%)	Antamina Mine, Ancash Region	5
Do.		Compañía Minera Atacocha S.A. (Grupo Milpo, 88.19%)	Atacocha Mine, Pasco Region	15
Do.		Compañia Minera Casapalca S.A, (private, 100%)	Huarochi, Lima Region	6
Do.		Compañía Minera Milpo S.A. (Votorantim Metais - Cajamarquilla S.A., 49.89%)	El Porvenir Mine, Pasco Region; Cerro Lindo Mine, Ica Region	33
Do.		Compañía Minera Raura S.A. (private, 100%)	Raura, Lima Region	15
Do.		Compañía Minera San Ignacio de Morococha S.A. (private, 100%)	San Vicente Mine, Junin Region	4
Do.		Compañia Minera Santa Luisa S.A. (private, 100%)	Huanzalá Mine, Junin Region	9
Do.		Doe Run Peru S.R.L. (Doe Run Co., 100%)	Smelter at La Oroya, Junin Region	150
Do.		do.	Refinery at La Oroya, Junin Region	125
Do.		Empresa Administradora Chungar S.A.C. (Volcan Compañía Minera S.A.A., 100%)	Animon Mine, Pasco Region	30

See footnotes at end of table.

TABLE 2—Continued

PERU: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Lead—Continued		Empresa Minera Los Quenuales S.A. (Glencore Xstrata plc, 97.6%)	Iscaycruz and Yauliyacu Mines, Lima Region	13
Do.		Sociedad Minera Corona S.A. (Sierra Metals Inc., 82%)	Yauricocha Mine, Yauyos, Lima Region	20
Do.		Sociedad Minera El Brocal S.A.A. (Compañía de Minas Buenaventura S.A.A., 54.07%)	Tajo Norte Mine, Pasco Region	22
Do.		Volcan Compañía Minera S.A.A. (private, 100%)	Cerro de Pasco Mine, Pasco Region; Andaychagua, Carahuacra, San Cristobal, and Ticlio Mines, Junin Region	48
Molybdenum		Compañía Minera Antamina S.A. (BHP Billiton plc, 33.75%; Glencore-Xstrata plc, 33.75%; Teck Cominco Ltd., 22.5%; Mitsubishi Corp., 10%)	Antamina Mine, Huari, Ancash Region	7
Do.		Sociedad Minera Cerro Verde S.A.A. (Freeport-McMoRan Copper and Gold Inc., 53.56%; Sumitomo Metal Mining Co. Ltd., 21%; Compañía de Minas Buenaventura S.A.A., 19.58%; others, 5.86%)	Cerro Verde Mine, Arequipa Region	6
Do.		Southern Copper Corp. (Grupo Mexico S.A.B. de C.V., 82.3%)	Cuajone Mine, Moquegua Region; Toquepala Mine, Tacna Region	12
Natural gas	thousand cubic meters per day	Aguaytia Energy del Peru S.R.L., 100%	Block 31–C, Ucayali Region	410
Do.	do.	GMP S.A. (Grupo Graña y Montero, 100%)	Block 1, Talara Basin	160
Do.	do.	Pluspetrol Peru Corp. (Pluspetrol S.A.)	Blocks 56 and 88, Ucayali Basin	32,300
Do.	do.	Petróleo Brasileiro S.A.	Block X, Talara Basin	190
Petroleum, crude	42-gallon barrels per day	Petróleo Brasileiro S.A.	Block X, Talara Basin	11,600
Do.	do.	Perenco Peru Petroleum Ltd. (Perenco Group, 50%)	Block 67, Marañon Basin	6,000
Do.	do.	Pluspetrol Norte S.A.(Pluspetrol S.A., 100%)	Block 8, Marañon Basin	10,000
Do.	do.	Pluspetrol Norte S.A.(Pluspetrol S.A., 60%)	Block 1–AB, Marañon Basin	15,000
Do.	do.	Savia Peru S.A, 100%	Block Z–2B, Punta Laguna	10,000
Petroleum products	do.	Refinería La Pampilla S.A. (Repsol YPF, 51.03%)	La Pampilla refinery, Lima Region	102,000
Do.	do.	Petroperú S.A.	Talara refinery, Piura Region	65,000
Do.	do.	do.	Conchan refinery, Lima Region	15,500
Do.	do.	do.	Iquitos refinery, Loreto Region	12,000
Do.	do.	do.	Pucallpa refinery, Ucayali Region	3,300
Do.	do.	Petroperú S.A.	El Milagro refinery, Amazonas Region	2,000
Do.	do.	Pluspetrol S.A.	Shiviyacu refinery, Loreto Region	5,000
Phosphate rock		Compañia Minera Miski Mayo S.A.C. (Vale S.A., 40%, Mosaic Co., 35%, Mitsui & Co., Ltd., 25%)	Bayovar Mine, Piura Region	3,900
Silver	metric tons	Empresa Minera Los Quenuales S.A. (Glencore Xstrata plc, 97.6%)	Izcaycruz and Yauliyacu Mines, Lima Region	100
Do.	do.	Empresa Administradora Chungar S.A.C. (Volcan Compañía Minera S.A.A., 100%)	Animon Mine, Pasco Region	200
Do.	do.	Compañía Minera Ares S.A.C. (Hochschild Mining Plc, 100%)	Arcata Mine, Arequipa Region; Pallancata Mine, Ayacucho Region	200
Do.	do.	Compañía de Minas Buenaventura S.A.A. (private, 100%)	Julcani Mine, Huancavelica Region; Mallay and Uchucchacua Mines, Lima Region; Breapampa Mine, Ayacucho Region; Orcopampa Mine, Arequipa Region	500
Do.	do.	Volcan Compañía Minera S.A.A. (private, 100%)	Cerro de Pasco Mine, Pasco Region; Andaychagua, Carahuacra, San Cristobal, and Ticlio Mines, Junin Region	300
Do.	do.	Compañía Minera Milpo S.A. (Votorantim Metais - Cajamarquilla S.A., 49.89%)	El Porvenir Mine, Pasco Region; Cerro Lindo Mine, Ica Region	150
Do.	do.	Compañía Minera Antamina S.A. (BHP Billiton plc, 33.75%; Glencore Xstrata plc, 33.75%; Teck Cominco Ltd., 22.5%; Mitsubishi Corp., 10%)	Antamina Mine, Huari, Ancash Region	500

See footnotes at end of table.

TABLE 2—Continued
PERU: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Silver—Continued	metric tons	Pan American Silver Corp., 100%	Huaron Mine, Pasco Region	100
Do.	do.	Pan American Silver Corp., 92.3%	Morococha Mine, Junin Region	100
Do.	do.	Doe Run Perú S.R.L. (Doe Run Co., 100%)	Refinery at La Oroya, Junin Region	1,100
Do.	do.	Southern Copper Corp. (SPCC) (Grupo Mexico S.A.B. de C.V., 82.3%)	Ilo smelting and refining, Moquegua Region	150
Steel		Empresa Siderurgica del Peru S.A.A. (Gerdau S.A.)	Chimbote, Ancash Region	650
Do.		Empresa Laminadora del Pacífico S.A. (Acero Arequipa S.A., 100%)	Pisco, Ica Region	360
Tellurium	metric tons	Doe Run Perú S.R.L. (Doe Run Co., 100%)	Refinery at La Oroya	12
Tin	do.	Minsur S.A. (private 100%)	San Rafael Mine and plant, Puno Region	30,000
Do.	do.	do.	Pisco smelting and refining, Ica Region	45,000
Tungsten	do.	Malaga Inc.	Pasto Bueno, Ancash Region	NA [2]
Zinc		Compañía de Minas Buenaventura S.A.A. (private, 100%)	Mallay and Uchucchacua Mines, Lima Region	25
Do.		Compañía Minera Antamina S.A. (CMA) (BHP Billiton plc, 33.75%; Glencore Xstrata plc, 33.75%; Teck Cominco Ltd., 22.5%; Mitsubishi Corp., 10%)	Antamina Mine, Ancash Region	300
Do.		Compañía Minera Atacocha S.A. (Grupo Milpo, 88.19%)	Atacocha Mine, Pasco Region	50
Do.		Compañia Minera Casapalca S.A. (private, 100%)	Huarochi, Lima Region	40
Do.		Compañía Minera Milpo S.A. (Votorantim Metais - Cajamarquilla S.A., 49.89%)	El Porvenir Mine, Pasco Region; Cerro Lindo Mine, Ica Region	210
Do.		Compañía Minera Raura S.A. (private, 100%)	Raura, Lima Region	25
Do.		Compañía Minera San Ignacio de Morococha S.A. (private, 100%)	San Vicente Mine, Junin Region	40
Do.		Compañía Minera Santa Luisa S.A. (private, 100%)	Huanzalá Mine, Junin Region	35
Do.		Doe Run Perú S.R.L. (Doe Run Co., 100%)	Refinery at La Oroya	80
Do.		Empresa Administradora Chungar S.A.C. (Volcan Compañía Minera S.A.A., 100%)	Animon Mine, Pasco Region	112
Do.		Empresa Minera Los Quenuales S.A. (Glencore Xstrata plc, 97.6%)	Izcaycruz and Yauliyacu Mines, Lima Region	120
Do.		Sociedad Minera El Brocal S.A.A. (Compañía de Minas Buenaventura S.A.A., 54.07%)	Tajo Norte Mine, Pasco Region	90
Do.		Sociedad Minera Corona S.A. (Sierra Metals Inc., 81.80%)	Yauricocha Mine, Lima Region	25
Do.		Volcan Compañía Minera S.A.A. (private, 100%)	Cerro de Pasco Mine, Pasco Region; Andaychagua, Carahuacra, San Cristobal, Cristobal, and Ticlio Mines, Junin Region	225
Do.		Votorantim Metais - Cajamarquilla S.A. (Grupo Votorantim Metais S.A., 99%, and employees, 1%)	Refinery at Cajamarquilla, Lima Region	320

[e] Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

[1] Barrick Gold Corp. initiate closure activites at the Pierina Mine in August 2013.

[2] Placed on care-and-maintenance status.

TABLE 3

PERU: RESERVES OF MAJOR MINERALS IN 2013[1, 2]

(Thousand metric tons unless otherwise specified)

Commodity		Reserves
Coal, all types		1,250,000 [e]
Copper		68,404
Gold	metric tons	2,110 [3]
Iron ore		1,427,004
Lead		7,038
Molybdenum		3,055
Natural gas	trillion cubic meters	610
Natural gas liquids	million barrels	1,226
Petroleum crude	million barrels	1,104
Phosphate rock		820,000
Salt		100,000 [e]
Silver	metric tons	98,869
Sulfur		150,000 [e]
Tin		80
Uranium		100 [e, 4]
Zinc		29,046

[e] Estimated; estimated data are rounded to no more than three significant digits.

[1] Proven and probable.

[2] Sources: Ministerio de Energía y Minas del Perú: Anuario Minero, 2013 and Libro Annual de Reservas de Hidrocarburos, 2013.

[3] Excludes metal in placer deposits.

[4] Recoverable at prices of $100 or less per kilogram of uranium.

The Mineral Industry of Suriname

By Philip M. Mobbs[1]

In 2013, Suriname's mineral output included alumina, bauxite, cement that was produced from imported clinker, clays, crude oil, crushed stone, gold, gravel, refined petroleum products, and sand. The mining and quarrying sector accounted for about 6.2% of the country's real gross domestic product (GDP), and the construction sector, about 5.3% (Centrale Bank van Suriname, 2014b, c).

In 2013, the value of Suriname's exports was about $2.34 billion compared with almost $2.7 billion in 2012. Gold still accounted for 59% of the value of exports from Suriname in 2013 despite a 24% decrease in the value of gold exports (which was partially attributable to the decrease in international gold prices). Alumina accounted for 16% of exports, and crude oil, 1.5%. Mineral-related exports to the United States (which accounted for 1.7% of total exports from Suriname in 2013) consisted primarily of gold, which was valued at about $32.2 million. In 2013, Suriname's imports were valued at $2.17 billion compared with a revised value of almost $2.0 billion in 2012. Imports from the United States included iron and steel products (including finished metal shapes), which were valued at about $8.7 million; mining equipment, about $8.5 million; refined petroleum products, $7.4 million; and oilfield equipment, $6.2 million (Centrale Bank van Suriname, 2014a, p. 1, 11–12; U.S. Census Bureau, 2014a, b).

The Mining Decree of May 8, 1986, provides the basis for mining agreements; however, mining licenses are negotiated with the Government and promulgated as laws by De Nationale Assemblee (DNA) [the National Assembly]. Modifications and extensions of formal mining licenses are issued as legislative amendments. The Mining Decree also grants exclusive petroleum concession rights to state-owned companies and the Petroleum Law authorizes those companies to enter into agreements with established petroleum companies.

Production

Notable changes in mineral output in 2013 included that of refined petroleum products, which increased by 20.3% compared with that of 2012. The increase was attributable in part to the resumption of normal operations after a successful maintenance program at the country's only petroleum refinery that was completed in 2012. Data on mineral production are in table 1 (Staatsolie Maatschappij Suriname N.V., 2014a, p. 12–13).

Structure of the Mineral Industry

The Ministerie van Natuurlijke Hulpbronnen [Ministry of Natural Resources] was responsible for the development and management of the energy, mineral, and water resources of Suriname. The Geologische Mijnbouwkundige Dienst [Geological Mining Service] was the Government agency responsible for the mining industry. The Bauxiet Instituut Suriname [Bauxite Institute of Suriname] collected data on bauxite. The state-owned Grasshopper Aluminium Co. (Grassalco N.V.) held interest in some bauxite, sand, and stone production operations. State-owned petroleum company Staatsolie Maatschappij Suriname N.V. explored for and produced crude oil, operated the country's petroleum refinery, and entered into production-sharing agreements with domestic and international oil companies. Since 2011, the multicommittee Ordening Goudsector [Planning Commission for the Gold Sector], had been registering small-scale miners, the location of mining operations, and mining equipment in an attempt to restore Government authority over the sector, improve the environmental operational efficiency and the security of small-scale mining operations, and recover tax income (Kabinet van de President, undated).

In addition to domestic companies that recovered crude construction material from clay, sand, and gravel pits, and from stone quarries, a small number of private-sector mineral companies that produced nonindustrial minerals were operating in Suriname. Bauxite was mined and refined into alumina by the joint venture of Suriname Aluminum Company L.L.C. (Suralco) and N.V. Alcoa Minerals of Suriname, both of which were subsidiaries of Alcoa World Alumina L.L.C. Alcoa World Alumina was a joint venture of Alcoa Inc. of the United States (60% equity interest) and Alumina Ltd. of Australia (40%). Vensur N.V., of which Surcol Houdstermaatschappij N.V. owned an 82.24% interest, operated a grinding facility that processed imported cement clinker. Surcol was a joint venture of C. Kersten en Co. N.V. of Suriname and Cementos Argos S.A. of Colombia.

Rosebel Gold Mines N.V., which was a subsidiary of IAMGOLD Corp. of Canada (95% equity interest) and N.V. Grassalco (5%), was Suriname's only large-scale industrial gold producer. Sarafina N.V. and NaNa Resources N.V. were medium-scale domestic gold miners. About 20,000 local small-scale miners, and an additional 12,000 artisanal miners from Brazil who mostly were undocumented immigrants, were estimated to be involved in small-scale gold mining operations, primarily in the Brokopondo, Marowijne, and Sipaliwini Districts. Table 2 is a list of the major mineral industry facilities in Suriname (Kraaijer, 2013; McAraney, 2013).

Commodity Review

Metals

Bauxite and Alumina.—In 2013, alumina production in Suriname decreased to 1.15 million metric tons (Mt) from a revised 1.20 Mt in 2012. Bauxite production decreased to

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[1] Deceased.

2.71 Mt from 2.87 Mt in 2012, as permitted bauxite deposits were mined out. Bauxite operations included production from the open pits in the Coermotibo mining area and the Onverdacht mining area. The Coermotibo mining area, which included the Bushman Hill, the CBO Explo, the Lost Hill, and the Remnant deposits, is located about 100 kilometers (km) east-southeast of Paramaribo. The Onverdacht mining area, which included the Kaaimangrasi, the Klaverblad, and the Sumau 1 deposits, is located about 20 km south-southeast of Paramaribo near the Suralco alumina refinery. The Caramacca Mine is located about 25 km east of the Paranam refinery (Alcoa Inc., 2014, p. 9).

The bauxite reserves at Coermotibo, Kaaimangrasi, and Klaverblad effectively were mined out in 2012, and the Government approved an extension of bauxite production from the Caramacca deposit where Suralco's mining rights expired in 2012. The Caramacca reserves were expected to be mined out in 2014. Bauxite from other mining licenses in eastern Suriname was expected to be mined out in the next few years as well. Alternative sources of bauxite to supply the Paranam refinery were being evaluated; specifically, the redevelopment of the Lelydorp I bauxite deposit, which is located in the Onverdacht mining area about 12 km northwest of the Suralco refinery. This mine had previously been mined in the 1980s, and approximately 3 Mt of bauxite reserves remained at Lelydorp I. Suralco also was evaluating a longer term bauxite mining project in the Nassau area, which is located about 104 km southeast of the Suralco refinery (Environmental Resources Management, 2011, p. ES-1–ES-2, 1-1–1-3).

Gold.—The Rosebel gold mine produced about 11 metric tons (t) of gold in 2013 compared with 12.5 t (revised) in 2012. As of December 31, 2013, Rosebel's proven and probable gold reserves amounted to about 133.3 Mt grading 1.0 gram per metric ton (g/t), which contained an estimated 133 t of gold. In 2013, DNA issued a legislative amendment to extend the terms of the existing mineral agreement for the Rosebel Mine by 15 years to 2042. The amendment also established a new joint venture (in which IAMGOLD held a 70% equity interest and the Government held the remaining 30% interest) that was expected to develop the gold resources that surrounded the Rosebel Mine (IAMGOLD Corp., 2014, p. 65, 68, 85).

Suriname Gold Company, LLC (Surgold), which was a joint venture of Alcoa and Newmont Mining Corp. of the United States, received authorization from DNA to proceed with the Merian gold project, which is located approximately 66 km south of the town of Moengo. The project was expected to begin commercial production in 2016 and to produce about 12 to 15 metric tons per year of gold from an open pit operation (Newmont Mining Corp., 2014).

The Government, the Kaloti Jewellery Group of the United Arab Emirates, and domestic companies agreed to build a gold refinery. Construction of the 60,000-kilogram-per-year-capacity Kaloti Suriname Mint House near Wit' Santi, which is located about 50 km south of Paramaribo near the international airport, began in 2013. Initial gold refining was expected to begin in 2014. The facility's full capacity was expected to be commissioned in 2015 (DevSur, 2013; Doran, 2013).

Mineral Fuels

Petroleum.—In 2013, Staatsolie, which operated three onshore oilfields, remained the only crude oil producer in Suriname. The country's proven crude oil reserves as of December 31, 2013, were estimated to be 92.5 million barrels (Mbbl) compared with 76.7 Mbbl at the start of the year. A number of petroleum exploration programs were active, primarily in the coastal and offshore areas. In 2013, Tullow Suriname B.V., which was a subsidiary of Tullow Oil plc of the United Kingdom, acquired a 30% participating interest in offshore Block 31 from Teikoku Oil (Suriname) Company, Ltd., which was a subsidiary of Inpex Corp. of Japan. Tullow Oil (70% interest) and Statoil Suriname AS (30% interest), which was a subsidiary of Statoil ASA of Norway, were evaluating offshore Block 47. Staatsolie signed production-sharing contacts with Petroliam Nasional Berhad (PETRONAS) of Malaysia for offshore Block 52 and with a joint venture of Statoil and Tullow for Block 54. RWE Dea AG of Germany subsequently acquired a 40% interest in Block 52 from PETRONAS. CEPSA Suriname S.A., which was a subsidiary of Compañía Española de Petróleos, S.A.U. (CEPSA) of Spain, acquired a 25% participating interest in offshore Block 53 from Apache Suriname Corporation L.D.C., which was a subsidiary of Apache Corp. of the United States. Other companies exploring offshore Suriname included the joint venture of Chevron Global Energy Inc. of the United States and Kosmos Energy Co. of Bermuda, which held exploration rights to Blocks 42 and 45, and Murphy Oil Corp. of the United States, which held exploration rights to Block 48 (Staatsolie Maatschappij Suriname N.V., 2014a, p. 65).

Tullow Oil transferred its 40% interest in the onshore Coronie Block to Paradise Oil Company N.V. of Suriname, which was a subsidiary of Staatsolie, and withdrew from the prospect. Paradise also was exploring offshore Block 4, and, onshore, on the Coesewijne, the Nickerie, the Weg naar Zee, and the Uitkijk Blocks.

Staatsolie's crude oil refinery's processing capacity was about 7,500 barrels per day (bbl/d); however, an expansion of the refinery capacity to 15,000 bbl/d was expected to be completed in late 2014. Once the expansion was completed, Staatsolie's refinery products would include asphalt, low-sulfur diesel, fuel oil, and gasoline (Staatsolie Maatschappij Suriname N.V., 2014a, p. 13; 2014b).

Outlook

Suriname's trade is expected to continue to be dominated by mineral industry output—in particular, by bauxite and gold exports. Because of the contribution of the mineral industry to the economy through dividends, royalties, and taxes, Government revenue also is subject to the volatility of international commodity prices. The revenue that the Government received from the mineral industry has decreased in the past 3 years. This trend is expected to continue, at least in the short term (International Monetary Fund, 2014, p. 32).

Proposals for mineral exploration in the country's undeveloped regions of the interior, which are inhabited by indigenous communities, have long raised the concerns of environmentalists and human rights groups. The influx of unregulated gold-mining activities in the interior in recent years and the associated environmental, security, and social problems have exacerbated those concerns (Weitzner, 2008, p. iv–xi).

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TABLE 1
SURINAME: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity[2]		2009	2010	2011	2012	2013
Aluminum:						
Bauxite, gross weight		3,388	3,104	3,236	2,874 [r]	2,706
Alumina		1,536	1,486	1,421	1,203 [r]	1,150
Cement, hydraulic[e]		65	65	65	65	65
Gold, mine output, Au content	kilograms	29,342 [r]	31,048 [r]	32,308 [r]	33,474 [r]	34,213 [p]
Petroleum:						
Crude	thousand 42-gallon barrels	5,860	5,800	5,990	5,940	5,980
Refined petroleum products	do.	2,740	2,700	2,630	2,310	2,780

[e] Estimated; estimated data are rounded to no more than three significant digits. [p] Preliminary. [r] Revised.

[1] Table includes data available through December 31, 2014.

[2] In addition to the commodities listed, clay, gravel, sand, and crushed stone also were produced in Suriname, but information is inadequate to make reliable estimates of output.

TABLE 2

SURINAME: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Country and commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina		Joint venture of Suriname Aluminum Company, L.L.C. (Suralco), 55%, and N.V. Alcoa Minerals of Suriname, 45%)	Suralco refinery at Paranam, about 25 kilometers south-southeast of Paramaribo	2,207 [1]
Bauxite		do.	Caramacca Mine, about 40 kilometers southeast of Paramaribo	NA
Do.		do.	Coermotibo area open pit mines, about 100 kilometers east-southeast of Paramaribo	2,000
Do.		do.	Onverdacht area open pit mines, about 20 kilometers south-southeast of Paramaribo	NA
Cement		Vensur N.V. (Surcol Houdstermaatschappij N.V., 82.24%)	Clinker grinding facility near Livorno, about 5 kilometers south of Paramaribo	60
Gold:				
Ore	kilograms	Rosebel Gold Mines N.V. (IAMGOLD Corp., 95%, and N.V. Grassalco, 5%)	Rosebel Mine, Brokopondo District, about 80 kilometers south of Paramaribo	12,500
Do.	do.	NaNa Resources N.V.	Lawagebied, Benzdorp area	NA
Do.	do.	Sarafina N.V.	Aqua Azul	NA
Do.	do.	Artisanal miners	Various locations, including the Brokopondo, the Marowijne, and the Sipaliwini Districts	25,000 [e]
Refined metal	do.	Kaloti Suriname Mint House (Government, Kaloti Jewellery Group, and private investors)	Wit' Santi, about 50 kilometers south of Paramaribo	60,000 [2]
Petroleum:				
Crude oil	thousand 42-gallon barrels	Staatsolie Maatschappij Suriname N.V. (Government, 100%)	Calcutta field, Tambaredjo field, and Tambaredjo North West field, Saramacca District	6,100
Petroleum products	do.	do.	Crude oil refinery at Tout Lui Faut, near Livorno, about 5 kilometers south of Paramaribo	2,800 [3]

[e] Estimated. Do., do. Ditto. NA Not available.

[1] An additional 870,000 metric tons per year of capacity has been idled since 2009 pending development of additional bauxite resources in Suriname and renewed demand by the international alumina market.

[2] Under construction.

[3] The ongoing expansion of the facility's production capacity to about 5.5 million barrels per year was expected to be completed in 2014.

THE MINERAL INDUSTRY OF VENEZUELA

By Yadira Soto-Viruet

Alumina, aluminum, bauxite, cement, gold, iron and steel, and nickel were the mineral and mineral-based commodities that were the most significant to Venezuela's economy. Other mineral commodities produced in the country included clays, feldspar, kaolin, limestone, nitrogen (ammonia), phosphate rock, quartz, sand, and sulfur. Venezuela was also a significant producer of crude oil and natural gas. In 2013, the country was ranked 12th among the world's leading producers of oil and 9th among the world's leading exporters of oil. Venezuela's real gross domestic product (GDP) increased by 1.3% compared with that of 2012. In 2013, the petroleum sector accounted for 11% of the GDP and about 95% of the country's export earnings. Venezuela contains some of the largest oil and natural gas proven reserves in the world. In 2013, proven crude oil reserves were estimated to be 298.3 billion barrels (Gbbl) and natural gas reserves were estimated to be 5,581 billion cubic meters. According to the U.S. Energy Information Administration, Venezuela was the fourth largest supplier of imported crude oil and petroleum products to the United States in 2013. The Government-owned petroleum company Petróleos de Venezuela S.A. (PDVSA) continued to control the exploration for and production of asphalt, natural gas, and petroleum and its derivatives. Venezuela continued to be a member of the Organization of the Petroleum Exporting Countries (OPEC) and an active participant in the global crude oil market (Banco Central de Venezuela, 2014; Organization of the Petroleum Exporting Countries, 2014, p. 22–23; Petróleos de Venezuela S.A., 2014a, p. 45; U.S. Energy Information Administration, 2014).

Minerals in the National Economy

In 2013, Venezuela's manufacturing sector accounted for about 13.7% of the total GDP, the construction sector accounted for about 7.7%, and the mining sector made only a minor contribution of about 0.3%. As of midyear 2013, about 1,500,000 people were employed in the manufacturing sector, about 1,100,000 in the construction sector, and about 168,000 in the hydrocarbon and mining sector (Banco Central de Venezuela, 2014; Instituto Nacional de Estadistica, 2014a, b).

Government Policies and Programs

According to the Venezuelan Constitution, all mineral and hydrocarbon resources belong to the Government. The Ministerio del Poder Popular de Petróleo y Minería (MPPM) (Decree No. 9.309 of December 5, 2012) is the Government entity responsible for all legal matters related to mining and petroleum activities. The Ministerio del Poder Popular para Industrias (Decree No. 8.609 of September 26, 2011) is the Government entity responsible for all legal matters related to industries. The Mining Law (Decree No. 295 of September 28, 1999) establishes the rules regarding all mines and minerals within Venezuela, including the exploration for and development, production, marketing, and transportation of minerals. The General Regulation of the Mining Law (No. 37.155 of March 9, 2001) establishes terms, conditions, and administrative procedures in support of Decree No. 295. The Hydrocarbon Law, which is known as the Decree with Force of Organic Law on Hydrocarbons (Decree No. 1.510 of November 2001), was amended in 2006 by the Partial Amendment Law to Decree 1.510 with Force of Organic Law of Hydrocarbons (No. 38.493 of May 4, 2006). The partial amendment law regulates exploration, mining, refining, industrialization, transportation, storage, marketing, and conservation of hydrocarbons and refinery products. The Organic Law on Gaseous Hydrocarbons (No 36.793 of September 23, 1999) regulates all matters relating to the existing gaseous hydrocarbon deposits in the country. The Organic Law for the Development of Petrochemicals Activities (No. 39.203 of June 18, 2009) was reformed in 2011 (No 39.218 of July 10). The law regulates all the petrochemical activities in the country (Ministerio del Poder Popular de Petróleo y Minería, 2014, p. 68–71; Ministerio del Poder Popular para Industrias, 2014b).

The Decree with Rank, Value, and Force of the Organic Law (Decree No. 8.413 of August 23, 2011) regulates matters related to gold exploration, mining, and related activities. According to the decree, all Venezuelan mining assets, including those owned by private enterprises, must be transferred to a mixed-interest enterprise (joint venture), of which the private enterprises cannot own more than 45%. If a private enterprise is unable to agree upon the terms and conditions of the decree, then 100% of the company's mining concessions, related contracts, and assets revert to the Government. On December 8, 2011, the decree was amended by the Partial Reform of the Decree with Rank, Value, and Force of the Organic Law (Decree No. 8.683), which reserves all the gold exploration, mining, and related activities to the Government. On January 30, 2013, the Government, by Decree No. 9.368, granted PDVSA, or any affiliate designated by it, the authority to explore and mine gold deposits as well as perform related activities (República Bolivariana de Venezuela, 2011a, b; 2013a; Ministerio del Poder Popular de Petróleo y Minería, 2014, p. 71).

Until March 14, 2012, Rusoro Mining Ltd. of Russia held 95% interest in the Choco 10 Mine and 50% interest in the Isidora Mine, which was a joint venture with the Government. The company was unable to reach an agreement with the Government on the terms and conditions of the migration of its assets to the mixed enterprise within the designated time periods. On March 14, 2012, in accordance with the decree, all Rusoro's mining concessions expired and all operations reverted to the Government, which became the new operator and employer. On March 21, 2013, Rusoro filed a "Statement of Claim" against Venezuela, based on a March 15, 2013, valuation performed by an independent expert. The claim was filed at the World Bank International Center for Settlement of Investment Disputes (ICSID). Rusoro sought compensation for all its losses caused by Venezuela's breaches of the "Bilateral Investment Treaty" in the amount of $3.03 billion (Thomson Reuters, 2013; Rusoro Mining Ltd., 2014, p. 3).

The Government by the Decree No. 455 of October 1, 2013, appointed its wholly owned Corporacion Venezolana de Mineria S.A. (CVM) the right of exploration and mining of nickel and associated minerals. CVM operated CVM Loma de Niquel located in the States of Aragua and Miranda. In 2012, Anglo American plc of the United Kingdom shut down operations at Loma Niquel, stating that despite attempts to obtain concession and permit renewals, the application for renewal was refused and the concession and permits granted by the Government expired in November 2012 (Anglo American plc, 2013, p. 73; República Bolivariana de Venezuela, 2013b; Petróleos de Venezuela S.A., 2014a, p.162).

Venezuela's legal framework for foreign investment requires equal treatment for both foreign and domestic companies, with the exception of the sectors in which the Government or Venezuelan nationals must be majority owners, including hydrocarbons and mineral commodities. Foreign investors need to register with the Superintendent of Foreign Investments within 60 days of the date of their investment. The Venezuelan Constitution of 1999 treats capital investment as a means of promoting the development of the national economy. Article 301 of the Constitution adopts international standards for the treatment of private capital, with equal treatment of domestic and foreign capital. Article 302 reserves strategic sectors, such as crude oil and hydropower, for the Government. Also, the banking, hydrocarbons, mining, insurance, and telecommunications sectors are regulated by "special laws" that supplement the Constitution and affect the business environment. Of these, the hydrocarbons sector has the most significant restrictions on foreign investment. The 2001 Hydrocarbons Law reserves for the Government the rights to prospecting, exploration, production, and initial transportation and storage of petroleum and associated natural gas. Under this law, primary activities must be carried out directly by the state, by a 100% Government-owned company, such as PDVSA, or by a joint-venture company in which more than 50% of the shares are held by the Government. The law leaves refining ventures open to private investment as well as commercialization activities under a license and permit regime. It also stipulates that any arbitration proceedings are to be conducted in domestic, not international, venues (U.S. Department of State, 2014).

Production

In 2013, kaolin production increased by 14% to 2,793 metric tons (t) from 2,447 t in 2012; estimated petroleum refinery products, by 14% to 449.3 million barrels (Mbbl) from 393.1 Mbbl (revised); and unspecified clays, by 13% to 513,000 t from 452,000 t. Silica sand and gravel production decreased by 94% to 7,620 t from 117,788 t in 2012; limestone, by 62% to 2.2 million metric tons (Mt) from 5.9 Mt; sand, by 58% to 1.5 Mt from 3.6 Mt; coal, by 43% to 1.1 Mt from 1.9 Mt (revised); direct-reduced iron by 42% to 2.6 Mt from 4.5 Mt; phosphate rock, by 39% to 98,458 t from 162,435 t; and iron ore, gross weight and metal content, by 30% each, to 10.6 Mt from 15.1 Mt (revised) and to 6.6 Mt from 9.4 Mt (revised), respectively. Production of quartz decreased by 28% to 8,475 t in 2013 from 11,802 t in 2012; alumina, by 26% to 600,000 t from 808,000 t (revised); aluminum, by 25% to 152,100 t (estimated) from 203,000 t (revised); and gold, by 15% to 1,691 kilograms (kg) from 1,981 kg (revised). Data on mineral production are in table 1.

Structure of the Mineral Industry

The Government-owned PDVSA had monopoly control of Venezuela's petroleum sector. The Government-owned Corporación Socialista del Cemento S.A. controlled the cement sector through its subsidiaries, C.A. Fabrica Nacional de Cementos S.A.C.A. (FNC), Corporación de Cemento Andino C.A. (Cemento Andino), Empresa de Cemento Cerro Azul C.A. (Cemento Cerro Azul), Industria Venezolana de Cementos S.A. (INVECEM), and Venezolana de Cementos S.A.C.A. (VENCEMOS). These companies had a combined cement production capacity of about 10.2 million metric tons per year (Mt/yr). Table 2 is a list of major mineral industry facilities.

The Government-owned Corporacion Venezolana de Guayana (CVG) was composed of four companies—the aluminum smelters CVG Alumino del Caroni S.A. (CVG Alcasa) and CVG Venezolana de Aluminio C.A. (CVG Venalum), the carbon anode producer CVG Carbones del Orinoco, C.A. (CVG Carbonorca), and the bauxite and alumina production facility CVG Bauxilum C.A. (CVG Bauxilum). CVM owned 70% interest in Carbozulia, which operated the Mina Norte and the Paso del Diablo mines located in the State of Zulia and had the capacity to produce about 1.48 Mt/yr of coal. CVM Loma de Niquel had the capacity to produce about 14,400 metric tons per year (t/yr) of nickel content and 72,000 t/yr of ferronickel (Petróleos de Venezuela S.A., 2014a, p.162).

Mineral Trade

Venezuela's economic prospects remained mostly dependent on crude oil prices and the export of petroleum and its derivatives. The petroleum sector continued to benefit the country's economy owing to its significant contributions to the country's trade balance. In 2013, Venezuela's petroleum exports decreased by 6% to about 1.9 million barrels per day (Mbbl/d) from about 2.1 Mbbl/d in 2012 and petroleum product exports by 3% to about 490,000 barrels per day (bbl/d) from about 508,000 bbl/d in 2012. In 2013, Venezuela shipped to the United States an average of about 768,000 bbl/d of petroleum compared with about 929,000 bbl/d in 2012 and about 72,000 bbl/d of petroleum products in 2013 compared with about 66,000 bbl/d in 2012 (Petróleos de Venezuela S.A., 2014a, p. 106–107; U.S. Energy Information Administration, 2014).

Venezuela's exports to the United States were valued at about $31.9 billion in 2013 compared with about $38.7 billion in 2012. Of this amount, crude oil accounted for about $27.8 billion; petroleum products, about $3.2 billion;

nonmonetary gold, about $136.4 million; iron and steel, about $104.6 million; bauxite and aluminum, about $25.2 million; coal and related fuels, about $3.9 million; and fuel oil, about $1.9 million. Imports from the United States were valued at $13.2 billion in 2013 compared with a revised $17.5 billion in 2012; these included $1.7 billion in petroleum products; $957.6 million in fuel oil; $317.1 million in drilling and oilfield equipment; $250.4 million in natural gas liquids; $130.7 million in excavating machinery; and $18.7 million in specialized mining equipment (U.S. Census Bureau, 2014a, b).

Commodity Review

Metals

Aluminum and Bauxite and Alumina.—In 2013, CVG Alcasa began operations at its Alcasa extrusion plant. The construction of the plant cost about $49.2 million and was part of a long-term development fund established between China and Venezuela in 2011. The joint development fund included the investment of about $403 million in a 2-year project to restore operating levels at CVG Alcasa. The new extrusion plant had a production capacity of about 23,500 t/yr and generated about 200 direct jobs. CVG Alcasa, which was located in the city of Guayana in the State of Bolivar, had an installed capacity of about 170,000 t/yr. In 2013, CVG Alcasa produced about 25,176 t of primary aluminum. The company employed 4,054 workers in 2013 and expected to produce about 83,300 t of liquid aluminum in 2014 (Ministerio del Poder Popular para Industrias 2014a, p. 69, 310–313, 319, 330).

CVG Venalum was a joint venture between CVG (80%) and a Japanese consortium (20%) consisting of Marubeni Corp., Mitsubishi Aluminum Co., Mitsubishi Materials Corp., Showa Denko K.K., Kobe Steel Ltd., and Sumitomo Chemical Co. Ltd. CVG Venalum had an installed capacity of about 430,000 t/yr of aluminum and supplied about 88% of its production to the domestic market. The company, which was located in Guayana in the State of Bolivar, produced 126,885 t of aluminum in 2013 and employed 4,887 workers. CVG Venalum expected to produce about 255,000 t of aluminum in 2014 (Ministerio del Poder Popular para Industrias, 2014a, p. 508, 515–516, 528, 531).

CVG Bauxilum had the capacity to produce about 2.0 Mt/yr of alumina and employed 3,160 workers in 2013. The company produced about 2.3 Mt of bauxite and 600,230 t of calcined alumina from Los Pijiguaos Mine in 2013. Los Pijiguaos Mine was located in the municipality of Cedeño, Bolivar State, and had an annual capacity of about 6 Mt of bauxite. The ore from Los Pijiguaos Mine was transported to the company's plant, which is located in Guayana in the State of Bolivar. CVG Bauxilum expected to produce about 978,000 t of alumina in 2014. CVG Carbonorca was a joint venture among CVG Bauxilum (44.43%), CVG Venalum (28.85%), and CVG (26.72%) and had an installed capacity of about 195,000 t. In 2013, CVG Carbonorca produced about 44,455 t of anodes and employed about 770 workers. The company expected to produce about 70,620 t of anodes in 2014 (Ministerio del Poder Popular para Industrias, 2014a, p. 434, 437–438, 442, 445, 454, 458, 464, 466, 468, 476).

Iron and Steel.—CVG Ferrominera Orinoco C.A. (CVG Ferrominera) was based in Puerto Ordaz in the State of Bolivar and produced iron concentrates, briquets, and pellets. CVG Ferrominera, which operated three plants, had an installed production capacity of about 23 Mt/yr of iron and the capacity to produce about 3.3 Mt/yr of pellets and 1.0 Mt/yr of briquets. In 2013, the company produced about 10.6 Mt of iron compared with 15.1 Mt in 2012; 126,315 t of briquets compared with 650,853 t in 2012; and 103,081 t of pellets compared with 882,510 t in 2012. CVG Ferrominera planned to produce 19.3 Mt of iron, 1.4 Mt of pellets, and 854,744 t of briquets in 2014. The company also expected to supply about 12.9 Mt of iron and pellets to the domestic market and to export about 5.2 Mt of iron and briquets. In 2013, the company employed about 7,360 workers compared with 7,129 in 2012. Siderurgica del Orinoco "Alfredo Maneiro" C.A. (Sidor) produced steel and had an installed capacity of about 4.2 Mt/yr. In 2013, the company, which was located in the Matanzas industrial zone, Puerto Ordaz, produced about 1.5 Mt of liquid steel compared with 1.7 Mt in 2012 and employed 13,222 workers compared with 12,349 in 2012. Sidor planned to produce about 2.4 Mt of steel in 2014. Complejo Siderúrgico de Guayana C.A. (Comsigua) produced hot briquets and had an installed capacity of about 1.0 Mt. In 2013, briquets production decreased by 57% to 300,000 t compared with 693,979 t in 2012. The decrease in production was attributed to a decrease in the supply of raw materials (pellets) from CVG Ferrominera and Sidor, which are the company's main providers of raw materials. Comsigua expected to produce 863,550 t of briquets in 2014 (Ministerio del Poder Popular para Industrias, 2014a, p. 721, 753–756, 761–763, 788, 803, 805, 807, 825).

Industrial Minerals

Cement.—Venezuela planned to increase its annual cement production capacity to cover domestic demand in 2014. Proposed projects included the construction of a second production line at the San Sebastian plant (operated by INVECEM) with a production capacity of 1.0 Mt/yr, which was expected to begin operating in September 2014; the construction of a new production line at the Llanadas de Monay plant (operated by Cementos Andino) with a capacity to produce 1.2 Mt/yr by 2015; and completion of construction at the Cerro Azul plant. The Cerro Azul plant was expected to begin operating in the fourth quarter of 2014 and to have a production capacity of about 1.0 Mt/yr of cement. Venezuela, which produced 7.8 Mt of cement in 2013, expected to produce 8.7 Mt in 2014 (Ministerio del Poder Popular para Industrias, 2014a, p. 138, 594).

Mineral Fuels

Natural Gas and Petroleum.—PDVSA was supervised and controlled by the MPPM. Production of crude oil and natural gas was mainly concentrated in the Barinas-Apure basin (formerly known as the Meridional Central Barinas y Apure), the Carupano basin, the Maracaibo-Falcon basin (formerly known as the Occidental-Zulia basin), and the Oriental basin. Most of Venezuela's natural gas output was associated with petroleum production. In 2013, natural gas production was about 209 million cubic meters per day (reported as 7.4 billion cubic feet per day), of which about 71% was consumed by the petroleum sector, about 27% by the domestic market, and 2% was transformed to liquefied natural gas (LNG). The country also received about 5.7 million cubic meters of natural gas per day (reported as 203 million cubic feet per day) from the Chevron Corp. of the United States and the Empresa Colombiana de Petroleos S.A. of Colombia through the Antonio Ricaurte 219-kilometer gas pipeline, which connects the Bajo Grande refinery in Venezuela and the Punta Ballena natural gas field in Colombia. According to the U.S. Energy Information Administration, in 2013, Venezuela's natural gas consumption amounted to 30,500 million cubic meters (reported as 1,077 billion cubic feet) compared with 31,400 million cubic meters in 2012. In 2013, proven crude oil reserves were estimated to be about 227.2 Gbbl at the Oriental basin, 19.6 Gbbl at the Maracaibo-Falcon basin, about 1.2 Gbbl at the Barinas-Apure basin, and about 343 Mbbl at the Carupano basin. In 2013, crude oil production was 2,899 Mbbl/d compared with about 2,910 Mbbl/d in 2012. In 2013, crude oil consumption amounted to about 784,000 bbl/d compared with about 777 bbl/d in 2012 (Petróleos de Venezuela S.A., 2014a, p. 45, 47, 53, 79; U.S. Energy Information Administration, 2014).

Chevron's production activities in Venezuela were performed by Petroboscan S.A., Petroindependiente S.A., and Petropiar S.A. Chevron partnered with PDVSA on each of these projects. According to Chevron, total net daily production in 2013 from all the company's producing areas in the country averaged 61,000 barrels (bbl) of crude oil and 0.7 million meters of natural gas. Petroboscan, in which Chevron held a 39.2% interest, operated the onshore Boscan field, located in the State of Zulia in western Venezuela, under a contract that was to expire in 2026. In 2013, net daily production averaged 26,000 bbl of liquids and 0.2 million cubic meters of natural gas. In 2013, Chevron reported that 21 development wells were drilled in the Boscan field. Chevron held 25.2% interest in Petroindependiente, which operated the LL–652 field in Lake Maracaibo under a contract that was to expire in 2026. Net daily production averaged 1,000 bbl of liquids and 2 million cubic meters of natural gas in 2013. The company also held 30% interest in Petropiar, which operated the Hamaca project under an agreement that was to expire in 2033. During the year, enhanced oil recovery studies continued at the Petropiar project, and 62 development wells were drilled. Petropiar, which is located in the country's Orinoco Belt, produced extra-heavy crude oil and upgraded it into synthetic crude oil. In 2013, net daily production averaged 25,000 bbl of synthetic crude oil, 9,000 bbl of extra-heavy crude oil, and 0.4 million cubic meters of natural gas (Chevron Corp., 2014a, p. 20; 2014b).

Chevron also held 34% interest in Petroindependencia S.A., which was working for the development of the Carabobo 3 project. The heavy oil project was located in three blocks within the Carabobo Area of the Orinoco Belt. The initial license for the concession was for 25 years, and the license could be extended for an additional 15 years upon startup and initiation of thermal recovery operations. The company also continued to prepare a development concept for Block 2 (the Loran field) and Block 3 (the Manatee field in Trinidad and Tobago), which was located in the offshore Plataforma Deltana region. The company held 60% interest and 100% interest, respectively, in the Loran and the Manatee fields, which form a single, cross-border field that lies along the maritime border of Venezuela and Trinidad and Tobago (Chevron Corp., 2014a, p. 20; 2014b).

As of 2013, at least 14 international companies in joint venture with PDVSA were engaged in oil exploration in the country. These included China National Petroleum Corp. (CNPC); Empresa Nacional del Petroleo of Chile; Union Cuba Petroleo of Cuba; EP Petroecuador of Ecuador; Reliance Petroleum Ltd. and Oil and Natural Gas Corp. Ltd. (ONGC) of India; Petropars Ltd. of Iran; Japan Oil, Gas and Metals Corp. (JOGMEC); Petroliam Nasional Berhad of Malaysia; Galp Energia of Portugal; LUKOIL Oil Company and Rosneft of Russia; PetroSA of South Africa; and Repsol S.A. of Spain (Petróleos de Venezuela S.A., 2014a, p. 69).

In May, PDVSA and Rosneft signed a joint-venture agreement for the development of crude oil and gas in the Carabobo 2 North Block and th eCarabobo 4 West Block, which cover an area of about 132 square kilometers (km^2) and 210 km^2, respectively. The blocks are located in the Orinoco Belt and reserves were estimated to be 40 Gbbl. The joint venture expected to produce about 400,000 bbl/d of oil by 2019. PDVSA held 60% interest and Rosneft held the remaining 40% interest in the blocks, through its subsidiary Petrovictoria S.A. In September, PDVSA and CNPC signed an agreement for the development of the Junin 10 block, which is located in the Orinoco Belt. The joint venture planned to produce about 220,000 bbl/d, at an investment cost of $14 billion. Proven reserves at the Junin 10 Block were estimated to be 10.5 billion barrels of extra-heavy oil. In October, PDVSA also signed an agreement with ONGC for the development of the Ayacucho 3 Block, which is located in the Orinoco Belt. The block covers an area of about 55 km^2 and proven reserves were estimated to be 235 Gbbl of heavy oil and extra-heavy oil (Bogdanova, 2013; El Impulso, 2013; Rosneft, 2013, 2014, p. 76; Wallis, 2013; Petróleos de Venezuela S.A., 2014a, p. 68, 70).

PDVSA reported that Venezuela had 1.3 Mbbl/d of crude oil refining capacity in 2013, all of which was operated by PDVSA (100% interest). The major facilities included the Paraguana refinery center (955,000 bbl/d), the Puerto de la Cruz refinery (187,000 bbl/d), and El Palito refinery (140 bbl/d). The Paraguana center included the Amuay and the Cardon refineries, which had production capacities of 645,000 bbl/d and 310,000 bbl/d, respectively. The center also included the Bajo Grande refinery, which was located in the State of Zulia and had an annual capacity of 16,000 bbl/d. In 2013, Paraguana processed 654,000 bbl/d. The center supplied 63% of its products to the domestic market and exported 37% to countries in Africa, the Caribbean, CentralAmerica, South America, and Europe. The Puerto de la Cruz refinery was located in the State of Anzoategui and processed 173,000 bbl/d of crude oil in 2013. The Puerto de la Cruz supplied 54% of its products to the domestic market and exported 46% to countries in Asia, the Caribbean, Europe, and North America. PDVSA continued the development of the deep conversion project at

Puerto de la Cruz, which was expected to increase production capacity to 210,000 bbl/d and to be completed by 2017. During 2013, PDVSA also continued its expansion project at El Palito refinery, which was expected to increase the production capacity there to 280,000 bbl/d. The company expected to complete the project by 2019. El Palito refinery, which was located in the State of Carabobo, processed 128,000 bbl/d of crude oil in 2013. El Palito supplied 81% of its products to the domestic market and 19% to countries in Asia and North America (Petróleos de Venezuela S.A., 2014a, p. 92–95).

Plans were underway for the construction of two new petroleum refineries at Cabruta and Llanos de Barinas (Batalla de Santa Inés refinery). The Cabruta refinery would be located in the State of Guarico and would have a production capacity of 221,000 bbl/d. The construction of the Cabruta refinery would include three phases—the construction of a heavy fuel upgrader, then a fuel refinery, and then a petrochemical refinery at a combined cost of about $8.3 billion. PDVSA expected to complete the third phase by 2027. In December, PDVSA awarded the contract for the construction of the first phase of the 100,000-bbl/d Batalla de Santa Inés refinery to Hyundai Engineering & Construction Co. Ltd. of the Republic of Korea and Wison Engineering Services Co. Ltd. of China, at a cost of about $2.3 billion. The first phase of the two-phase development strategy was expected to be completed by 2016, and the processing of diesel, fuel oil, and regular gasoline would then begin (Petróleos de Venezuela S.A., 2013, 2014b).

According to PDVSA's 2013–19 investment plan, the company planned to increase natural gas production capacity to 222 million cubic meters per day in 2014 and 310 million cubic meters per day by 2019 and oil production capacity to 3.3 Mbbl/d in 2014 and 6.0 Mbbl/d by 2019. The company also planned to increase refinery production capacity to 1.8 Mbbl/d by 2019 and to export 1.3 Mbbl/d of oil to the Caribbean and Latin America and 3.1 Mbbl/d to China, India, and Japan by 2019 (Petróleos de Venezuela S.A., 2014a, p. 39).

Outlook

According to the International Monetary Fund, Venezuela's GDP is forecasted to decrease by 4.0% in 2014 (International Monetary Fund, 2015, p. 58). Political and economic uncertainty makes the country a difficult climate for foreign investors and is unlikely to be resolved in the short to medium term (U.S. Department of State, 2014). The country aims to increase its natural gas, crude petroleum and petroleum refinery production capacity, and the key challenge for Venezuela in meeting this goal is obtaining new investments and completing the technological upgrades of infrastructure that are required to produce crude oil from the unconventional petroleum reserves in the Orinoco Belt. Venezuela continues to seek foreign investment for further development of its oil and natural gas sectors. The country's large reserves of petroleum (the largest in the Americas) and PDVSA's exploration and production joint ventures are expected to encourage new investments and additional development of hydrocarbon resources in the Orinoco Belt. Natural gas will be incorporated into the country's energy supply as progress is made on future offshore gas developments on the Deltana Platform off the coast of eastern Venezuela and in the Paraguana Peninsula in the northwestern part of the country. PDVSA's plans to develop the Cabruta and the Batalla de Santa Inés refineries are likely to encourage the continuation of Venezuela's strategic alliances and also to attract new investments.

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TABLE 1
VENEZUELA: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity[2, 3]		2009	2010	2011	2012	2013
METALS						
Aluminum:						
Alumina		1,376 [r]	1,244 [r]	1,265 [r]	808 [r]	600
Bauxite		3,611 [r]	3,126 [r]	2,455	2,286 [r]	2,160
Metal, primary, unalloyed	metric tons	561,100	335,000	380,000 [e]	203,000 [r]	152,100 [e]
Gold, mine output, Au content	kilograms	12,232 [r]	6,991 [r]	4,608 [r]	1,981 [r]	1,691
Iron and steel:						
Iron ore and concentrate:[e]						
Gross weight		13,801 [r, 4]	14,004 [r, 4]	17,037 [r, 4]	15,124 [r, 4]	10,583 [4]
Metal content		8,600 [r]	8,700 [r]	10,600 [r]	9,400 [r]	6,600
Metal, direct-reduced iron[5]		5,508 [r]	3,793 [r]	4,475 [r]	4,472 [4]	2,600
Ferrosilicon[e]	metric tons	52,100 [4]	76,800 [4]	70,000 [4]	81,000	81,000
Steel, crude[5]		3,808	2,207	2,980 [r]	2,359 [r]	2,250
Nickel, mine output, Ni content[e]	metric tons	13,200 [r]	11,400 [r]	19,500 [r]	6,060 [r]	6,000
INDUSTRIAL MINERALS						
Cement[e]		7,900 [r]	7,120 [r]	7,760 [r]	7,700	7,800 [4]
Clays, unspecified		1,674	1,168	1,080	452	513
Feldspar		1,059 [r]	925 [r]	1,715 [r]	584 [r]	580
Quartz	metric tons	80,977	38,698	25,252	11,802	8,475
Kaolin	do.	--	9,444	1,482	2,447	2,793
Limestone		14,258	10,722	8,569	5,893	2,190
Phosphate rock, gross weight	metric tons	362,753	85,240	167,741	162,435	98,458
Nitrogen, N content of ammonia[e]		1,160	1,160	1,200	1,200	1,200
Sand		9,007	4,850	1,066	3,621	1,530
Sand and gravel, silica	metric tons	674,452	459,236	500,000 [e]	117,788	7,620
Sulfur, petroleum byproduct[e]		570 [4]	800	800	800	800
MINERAL FUELS AND RELATED MATERIALS						
Coal, bituminous		3,728 [r]	2,630 [r]	2,611 [r]	1,911 [r]	1,083
Natural gas:[6]	million cubic meters					
Gross	do.	72,171 [r]	71,075 [r]	73,274 [r]	75,968 [r]	76,440
Marketed	do.	18,430 [r]	19,728 [r]	20,769 [r]	22,726 [r]	21,820
Natural gas liquids[e]	thousand 42-gallon barrels	58,000	53,700	48,200	45,300	42,300
Petroleum:[e, 7]						
Crude[8]	do.	1,099,400 [r]	1,085,900 [r]	1,091,700 [r]	1,062,200 [r]	1,058,100
Refinery products[9]	do.	426,000 [r]	413,500 [r]	414,700 [r]	393,100 [r]	449,300

[e] Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r] Revised. do. Ditto.

[1] Table includes data available through October 14, 2014.

[2] In addition to the commodities listed, carbon black, common clay, diamond, ferromanganese, ferronickel, lead, salt, sand and gravel, silicomanganese, and stone were presumably produced, but available information is inadequate to make reliable estimates of output.

[3] Sources: Republica Bolivariana de Venezuela, Ministerio del Poder Popular de Petroleo y Mineria, Memoria 2013, and Ministerio del Poder Popular Para Industrias, Memoria 2013.

[4] Reported figure.

[5] World Steel Association, crude steel production, 2009–2013 and direct-reduced iron production, 2009–2013.

[6] Source: Organization of the Petroleum Exporting Countries, Annual Statistical Bulletin 2014.

[7] Excludes production under contract with the Government.

[8] Source: Petróleos de Venezuela S.A., Informe de Gestion Annual 2013.

[9] Includes asphalt, distillates, gasoline, jet fuel, kerosene, naphtha, paraffin, petroleum coke, and residuals. Excludes byproduct sulfur.

TABLE 2
VENEZUELA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina		CVG Bauxilum C.A. (Corporación Venezolana de Guayana)	Guayana, Bolivar State	2,000
Aluminum		CVG Aluminio del Caroní, S.A. (Corporación Venezolana de Guayana)	do.	170
Do.		CVG Venezolana de Aluminio C.A. [Corporación Venezolana de Guayana (CVG), 80%, and Showa Denko K.K., Kobe Steel Ltd., Sumitomo Chemical Co. Ltd., Mitsubishi Materials Corp., Mitsubishi Aluminum Co., and Marubeni Corp., 20%]	do.	430
Bauxite		CVG Bauxilum C.A. (Corporación Venezolana de Guayana)	Los Pijiguaos Mine, Cedeño, Bolivar State	6,000
Cement		C.A. Fabrica Nacional de Cementos S.A.C.A. (FNC) (Corporación Socialista del Cemento, S.A.)	Ocumare plant, Ocumare del Tuy, Miranda State	1,210
Do.		do.	Tachira plant, Palmira, Tachira State	220
Do.		Corporación de Cemento Andino C.A. (Corporación Socialista del Cemento, S.A.)	Llanadas de Monay plant, Trujillo State	800
Do.		Industria Venezolana de Cementos S.A. (INVECEM) del Cemento, S.A.)	Cumarebo plant, Falcon State	1,590
Do.		do.	San Sebastian plant, San Sebastian de los Reyes, Aragua State	1,200
Do.		Venezolana de Cementos S.A.C.A. (VENCEMOS) (Corporación Socialista del Cemento, S.A.)	Guyana plant, Bolivar State	330
Do.		do.	Lara plant, Lara State	490
Do.		do.	Mara plant, Zulia State	730
Do.		do.	Pertigalete plant, Anzoategui	2,680
Coal		Corporacion Venezolana de Mineria S.A. (CVM), 70% [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%)]	Mina Norte and Paso Diablo, Guajira, Zulia State	1,480
Ferronickel		Corporacion Venezolana de Mineria S.A. (CVM) [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%)]	Loma de Niquel, Aragua and Miranda States	72
Ferrosilicon		FerroAtlantica de Venezuela, S.A. (Grupo FerroAtlantica S.A., and Corporación Venezolana de Guayana, 20%)	Puerto Ordaz, Bolivar State	96
Gold	kilograms	CVG Compañía General de Minería C.A. [Corporación Venezolana de Guayana (CVG)]	Capitan Eduardo Vera plant, Bolivar State	NA [1]
Do.	do.	do.	Caratal plant, Bolivar State	NA [1]
Do.	do.	do.	Colombia Mine, Bolivar State	2,000 [e, 1]
Do.	do.	do.	El Peru plant, Bolivar State	NA [1]
Do.	do.	do.	Hansa San Luis Mine, Bolivar State	NA [1]
Do.	do.	do.	Isidora Mine, Bolivar State	2,500 [e, 1]
Do.	do.	do.	San Rafael/El Placer Mine, Bolivar State	200 [e]
Do.	do.	do.	Sosa Mendez Mine, Bolivar State	1,700 [e, 1]
Do.	do.	do.	Tomi Mine, El Callao, Bolivar State	2,000 [e]
Do.	do.	do.	Union Mine, Bolivar State	NA
Do.	do.	Promotora Minera de Venezuela (CVG Compañía General de Minería C.A.)	El Choco mines and plant, El Callao, Bolivar State	NA
Iron and steel:				
Iron:				
Direct reduced		Siderúrgica del Orinoco "Alfredo Maneiro" S.A. [Corporación Venezolana de Guayana (CVG), 80%]	Puerto Ordaz, Bolivar State	4,600
Hot briquetted		Complejo Siderúrgico de Guayana C.A. [Corporación Venezolana de Guayana (CVG)]	do.	1,000
Do.		Braquetera del Orinoco	do.	2,200
Do.		CVG Ferrominera Orinoco C.A. [Corporación Venezolana de Guayana (CVG)]	do.	1,000
Do.		Venezolana de Prereducidos de Caroní (International Briquettes Holding, 100%)	do.	815
Iron ore		CVG Ferrominera Orinoco C.A. [Corporación Venezolana de Guayana (CVG)]	Piar, Bolivar State	23,000

See footnotes at end of table.

TABLE 2—Continued
VENEZUELA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Iron and steel—Continued:				
Iron—Continued:				
Iron ore pellets		CVG Ferrominera Orinoco C.A. (Corporación Venezolana de Guayana (CVG)]	Puerto Ordaz, Bolivar State	3,300
Do.		Siderúrgica del Orinoco "Alfredo Maneiro" S.A. [Corporación Venezolana de Guayana (CVG), 80%]	do.	8,000
Steel		do.	do.	4,250
Natural gas	million cubic meters	Petroboscan S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 60.8%, and Chevron Corp., 39.2%]	Boscan field, Zulia State	70[e]
Do.	do.	Petroindependiente S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 74.8%, and Chevron Corp., 25.2%]	LL–652 field in Lake Maracaibo	700[e]
Do.	do.	Petropiar S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 70%, and Chevron Corp., 30%]	Hamaca field in Orinoco Belt	146[e]
Nickel, Ni content		Corporacion Venezolana de Mineria S.A. (CVM) [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%)]	Loma de Niquel, Aragua and Miranda States	14
Nitrogen content of ammonia		Petroquimica de Venezuela S.A. (Government, 100%)	Jose Antonio Anzoategui Petrochemical complex, Anzoategui State	1,200
Do.		do.	Ana Maria Campos Petrochemical complex, Zulia State	300
Do.		do.	Moron Petrochemical complex, Carabobo State	200
Petroleum:				
Crude	thousand 42-gallon barrels	Petroanzoategui S.A. [Petróleos de Venezuela S.A. (PDVSA), (Government, 100%), 100%]	Junin area	NA
Do.	do.	Petroboscan S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 60.8%, and Chevron Corp., 39.2%]	Boscan field, Zulia State	9,500[e]
Do.	do.	Petrocarabobo, S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 60%; PC Venezuela Ltd, 11%; Petrocarabobo Ganga B.V., 11%; Repsol S.A., 11%; Indoil Netherlands B.V., 7%]	Carabobo area	11,000[e]
Do.	do.	Petrocedeño S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 60%; Total S.A., 30.3%; Statoil ASA, 9.7%]	Zuata Region, Junin area	73,000[e]
Do.	do.	Petroindependiente S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%),74.8%, and Chevron Corp., 25.2%]	LL–652 field in Lake Maracaibo	370[e]
Do.	do.	Petrojunin S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 60%, and Eni S.p.A., 40%]	Block 5, Junin area	NA
Do.	do.	Petrolerasinovensa, S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 64.25%, and China National Petroleum Corp., 35.75%]	Sinovensa, Carabobo	NA
Do.	do.	Petromacareo S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 60%, and PetroVietnam (Vietnam Oil and Gas Group), 40%]	Block 2 North, Junin area	NA
Do.	do.	Petromiranda, S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 60%, and Consorcio Nacional Petroleo SRL, 40%]	Block 6, Junin area	NA
Do.	do.	Petromonagas S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 83.33%, and BP p.l.c., 16.67%]	Carabobo area	NA
Do.	do.	Petropiar S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 70%, and Chevron Corp., 30%]	Hamaca field in Orinoco Belt	3,300[e]
Do.	do.	Petrourica S.A. [Petróleos de Venezuela S.A. (PDVSA) (Government, 100%), 60%, and China National Petroleum Corp., 40%]	Block 4, Junin area	NA
Refinery products	do.	Petróleos de Venezuela S.A. (PDVSA) (Government, 100%)	Bajo Grande, Zulia State	5,800[e]
Do.	do.	do.	El Palito, Carabobo State	51,100[e]
Do.	do.	do.	Paraguana, Falcon State	348,600[e]
Do.	do.	do.	Puerto de la Cruz, Anzoategui State	68,300[e]
Do.	do.	do.	San Roque, Anzoategui State	1,800[e]
Phosphate rock		Petroquimica de Venezuela S.A. (Government, 100%)	Riecito Mine, Cerro Riecito, Falcon State	400

[e] Estimated. Do., do. Ditto. NA Not available.

[1] Suspended.

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